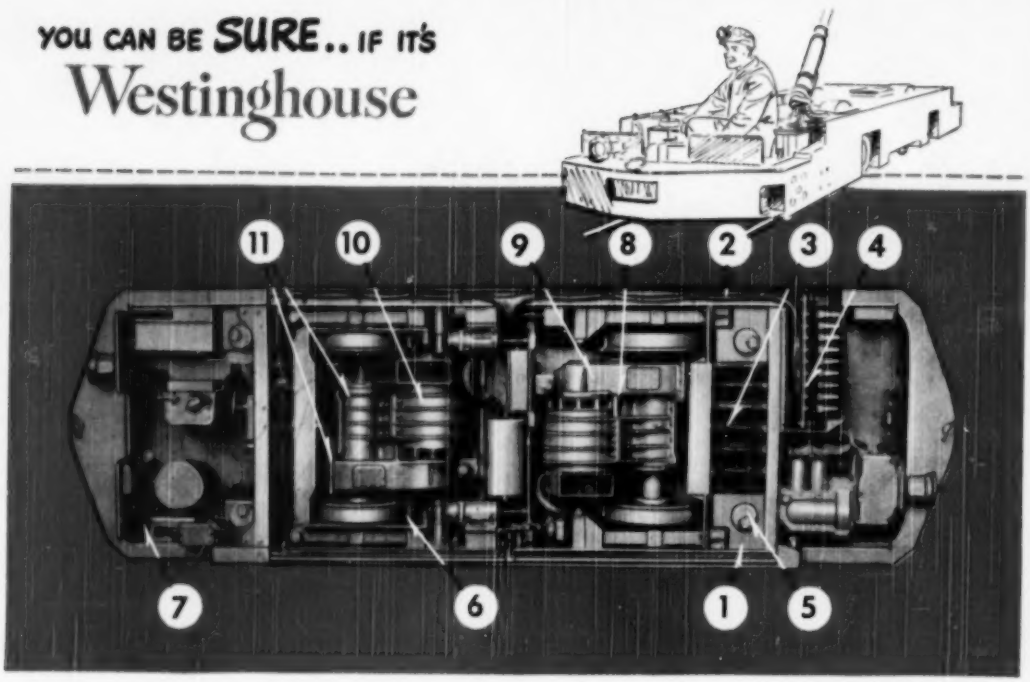
Coal Age

What's Ahead for Coal? ... p 54

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Low Liner construction means *More Low Coal!*

26" over-all height means access to low veins . . . fast, economical movement of low coal when you use the Westinghouse *Low Liner.* Compact design, efficient operation and simplified maintenance are provided by these carefully planned construction features:

1. Piping laid in trough on top of side frame with free access to every union, cock and joint.
2. Wiring enclosed in hose—placed in trough of other side frame.
3. Resistor mounted in one accessible frame—reducing wiring to a minimum.
4. Pneumatic contactors mounted adjacent to, but well protected from resistor.
5. Sandboxes with capacity normally found on higher locomotives.
6. Solid brake pull rods—instead of chains.
7. Side frames and bumpers are held together by tapered, reamed, driven-through bolts.
8. Motor and drive unit mounted in same gear casting.
9. Gearing of spur design—shafts mounted parallel to motor armature shaft.
10. No external couplings or drive parts. All wearing parts internally mounted and continuously lubricated.
11. Complete motor and gear assembly easily removed in same manner as axle-hung motor.
12. All equipment on locomotives accessible without moving adjacent parts.

Service and parts are as near as your telephone. For complete details, consult your Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15148

Westinghouse

MINE LOCOMOTIVES

Photo Courtesy E. L. Bruce Company

They wanted a rubber band that would not stretch

A typical example of B.F.Goodrich product improvement

IF YOU think all rubber is alike, take a look at that 80-foot-long rubber band "worth its weight in gold" because it *will not* stretch.

That belt drives all the machinery in the world's largest wood flooring mill. It used to be a leather belt but that stretched so badly it had to be re-glued every 30 days. Too expensive; too much trouble.

Someone suggested a rubber belt—but wouldn't a rubber belt stretch even more? Not the way B.F.Goodrich makes it. Our engineers had developed a belt so strong it rarely stretches and then invented a way to lock belt ends together (Make a belt endless, it's called) with a splice which never tears loose. Belt users say it ends 90% of all belting troubles and failures, makes belts last many times as long on many drives.

In the flooring mill, the belt in the picture has been in use 5 years.

Not once has it needed any attention nor repair; it has not stretched at all.

For long uninterrupted belt life, for constant machine operation with no delays for belting failures, the B.F. Goodrich Plylock Splice, as it is well named, has no equal. Your B.F.Goodrich distributor can make belts endless in your plant on the drive, or he can show your own employees how to do it. Call him. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

ALL-NEW-YEAR RESOLUTION

Start the year WRONG—for Friction Devils! Do the RIGHT thing . . . start using Hulburt Quality Grease for all your coal mining machinery and watch your lubrication and maintenance costs go down, as battle-scarred Friction Devils stay away from your equipment.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

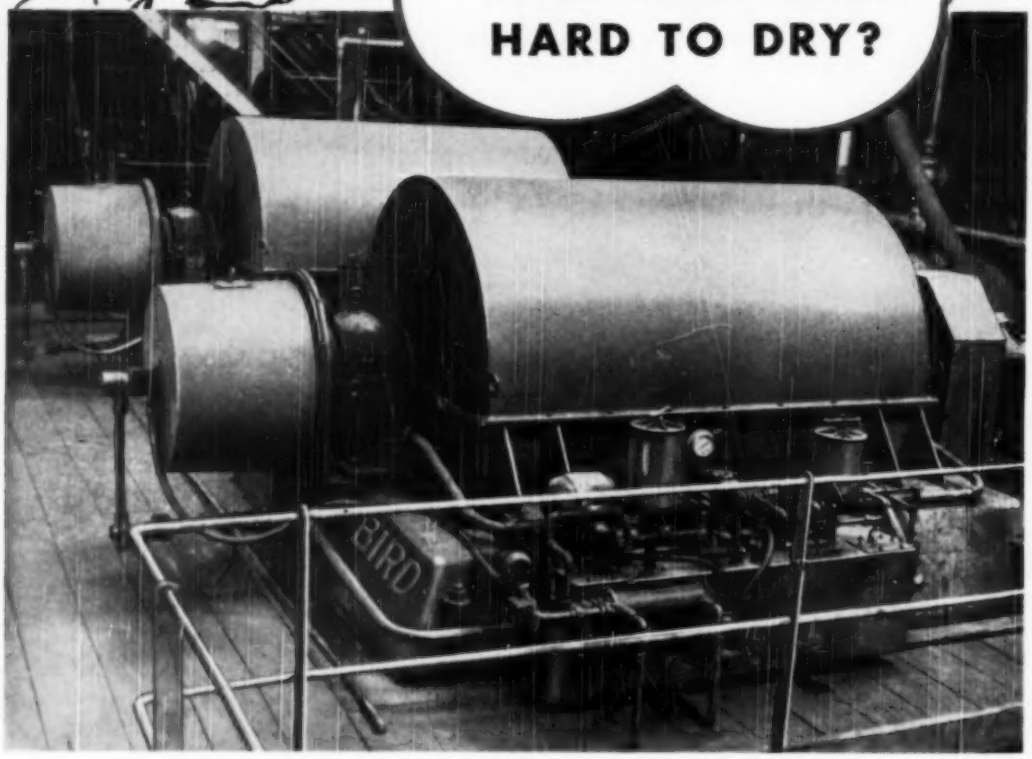
Specialists in Coal Mine Lubrication

for FRICTION DEVILS

Hulburt Quality GREASE

brings something more than "good resolutions" to the job of lubricating your coal mining machinery. HULBURT has what it takes—that QUALITY of composition that enables it to do the one job we make it for, and do it supremely well. Resolve now to get the lubrication you WANT—and KEEP your resolution with HULBURT QUALITY GREASE.

WHO SAID FINE COAL WAS HARD TO DRY?



Not the owners of these BIRD COAL FILTERS and dozens of others like them, that's sure!

Here's why:

1. One BIRD (54" size) handles up to a ton of ¼" x 0 coal a minute with a feed containing as low as 25% coal.

2. The BIRD gets it *dry* — down to 8 to 10% moisture when the feed contains about 10% minus 200 mesh fines.

3. The BIRD delivers well blended coal suitable for direct loading or for feeding to thermal dryers.

4. The BIRD permits a closed water system — the effluent is so clean it can be returned continually to the washing circuit.

5. The BIRD has little effect on particle size. Degradation is negligible.

6. The BIRD runs continuously for months without shutdowns for maintenance or overhaul.

Ask us to mail you the Bird Coal Filter Bulletin

BIRD MACHINE COMPANY, South Walpole, Massachusetts

The BIRD Continuous Centrifugal COAL FILTER

Coal Age

Alfred M. Staehle, Publisher — Ivan A. Given, Editor
J. H. Edwards — W. H. McNeal — W. A. Stanbury Jr.
H. Davis — F. A. Zimmerli — G. B. Bryant Jr., Washington
R. W. Davis, Sales Manager
World News Offices: London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City

Volume 55 — Number 1

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COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. Allow at least ten days for change of address. COAL AGE articles are indexed regularly by Engineering Index, Inc. COAL AGE'S own index published annually may be had on request to the Editorial Department. Contents Copyright 1950 by McGraw-Hill Publishing Co., Inc.; all rights reserved.

McGraw-Hill Publishing Company, Inc.—James H. McGraw (1860-1948), Founder. James H. McGraw Jr., President; Curtis W. McGraw, Vice President and Treasurer; Eugene Duffield, Senior Vice President, Publication Division; Nelson Bond, Vice President and Director of Advertising; Joseph A. Gerardi, Secretary; Dexter Keezer, Director Economics Department; J. E. Blackburn Jr., Vice President and Director of Circulation.

Subscription Information: All communications about subscriptions should be addressed to the Director of Circulation, COAL AGE, 330 South Desplaines St., Chicago 6, Ill., or 330 W. 42nd St., New York 18, N. Y. Please indicate position and company connection on all subscription orders. Subscription rates: United States and possessions, $3 for one year, $5 for two years, $10 for three years. Canada, $6 for one year, $10 for two years, $12 for three years. Pan-American countries, $6 for one year, $10 for two years, $12 for three years. All other countries, $15 for one year, $25 for two years, $30 for three years. Single copies, U. S. and possessions and Canada, 50c; Pan-American countries, 75c; all other countries, $1.50. Entered as second-class matter Aug. 27, 1946, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. Return postage guaranteed. Printed in the U. S. A. Cable Address: "McGraw-Hill, N. Y." Member A.B.P. Member A.B.C.

A McGRAW-HILL PUBLICATION

Publication office: 330 South Desplaines St., Chicago 6, Ill. **Editorial and executive offices:** 330 W. 42nd St., New York 18, N. Y. **Branch offices:** 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, Aldwych, London, W. C. 2; Washington, 4; Philadelphia, 3; Cleveland, 15; Detroit, 26; St. Louis, 1; Boston, 16; Atlanta, 3; Los Angeles, 14; 738-9 Oliver Bldg., Pittsburgh, 22; Dallas, 1.

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Run better— Last longer— Cost less for upkeep

—when you

Texaco Regal Starfak is a premium-quality ball and roller bearing grease designed for service in locomotives, electric motors, cutters, loaders, shakers and similar equipment. It assures longer bearing life and many savings in maintenance and operating costs.

Special processing gives *Texaco Regal Starfak* exceptional resistance to oxidation, gum formation, separation and leakage—in service and in storage. It stays in the bearings . . . runs

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TEXACO

TEXACO LUBRICANTS

Photo courtesy The Jeffrey Manufacturing Company

use TEXACO REGAL STARFAK

cool and without "drag," assuring economy in power consumption. *Texaco Regal Starfak* stands up under a wide temperature range . . . gives long service life . . . is easy to apply.

For low-speed anti-friction bearings in heavy-duty service, use *Texaco Marfak*. It "hugs" the bearing surfaces . . . shields against wear and rust . . . assures longer bearing life and lower maintenance costs.

Texaco has cost-saving lubricants for all your mining machinery. Let a Texaco Lubrication Engineer help you select the proper ones. Call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, New York.

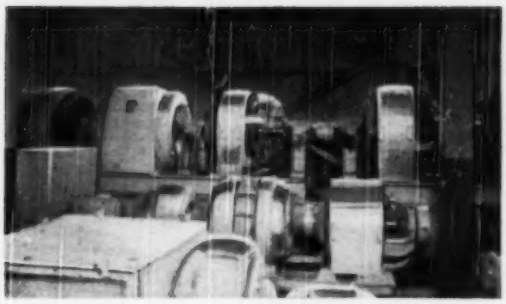
For the Coal Mining Industry

More earth moved in less time!

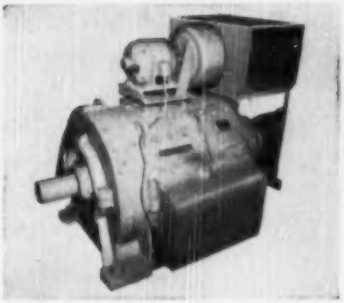
Substitution of a bucket with an approximate capacity of 46 cu yds in the place of its original and smaller one has made this Hanna Coal Co. machine, at Georgetown No. 12 mine, Ohio, one of the largest in the world. It is electrically equipped throughout by General Electric. Amplidyne control has resulted in substantially increased production. Though working on a 24-hour schedule, the shovel has lost practically no time for electrical maintenance since it was first put into operation in December 1946. More than 2500 shovels and draglines have been equipped with electric drive by General Electric.

AMPLIDYNE-CONTROLLED SHOVEL DRIVES

—to cut stripping costs per yard!

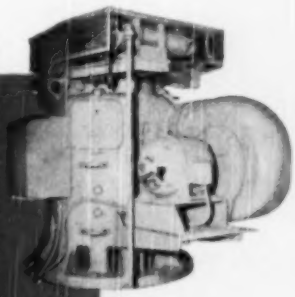


Hoist, swing, and crowd generators are driven by a G-E 1250-hp synchronous a-c motor (upper level). Shown on lower level is the power-factor amplidyne, exciter generator, and swing generator, all driven by a G-E 200-hp induction motor. The amplidyne synchronous motor field, says Mr. E. Gaston, electrical engineer of the Hanna Coal Company, maintains optimum power factor at full voltage, and reduces line losses to a minimum.

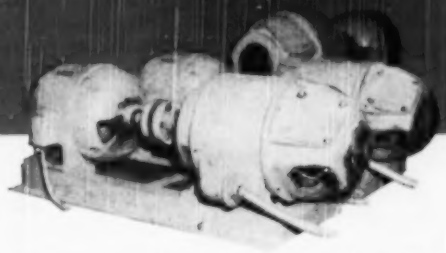


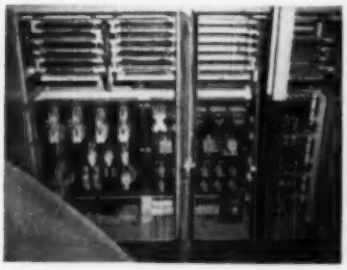
The huge bucket is raised and lowered by two G-E 425-hp MDP hoist motors, one of them shown here. Sturdy MDP motors incorporate such features as heavy steel frame to withstand severe service, dust-proof mountings for all bearings, improved banding and commutator design to permit operation at higher maximum safe speeds, and split frame to permit removal of top half for easy inspection of armature.

G-E amplidyne-controlled drive on Hanna Coal Company's giant stripping shovel provides faster hoist, swing, and crowd actions, works around the clock with minimum time lost for maintenance or repairs.



Swinging the shovel is the job of three G-E 125-hp MDV vertical swing motors (one shown at left). In addition to the main driving and control motors, some 30 auxiliary motors from 1- to 15-hp were furnished by G.E. for blowers, fans, oil pumps, steering, etc. Here an auxiliary Tri-Clad open dripproof motor drives the MDV motor's blower. Tri-Clad design and construction give three-way extra protection against physical damage, electrical breakdown, and operating wear and tear . . . proved by more than 1,500,000 Tri-Clads now in service.





Amplidyne control of hoist, swing, and crowd actions gives the operator instant shovel response. It provides faster acceleration and deceleration to cut seconds off each pass and increase daily yardage handled. The three G-E amplidynes shown control the three shovel motions precisely. Even at high speeds, they prevent the excessive current and torque peaks which might damage electrical and mechanical equipment.

Simpler and more compact, the G-E amplidyne control panel shown uses fewer control devices, and takes up less space in crowded quarters. During the past six years, modern amplidyne control has been engineered into nearly all large shovels and draglines equipped by General Electric. For better results, make sure *your* shovels have G-E equipment throughout. ***Apparatus Dept., General Electric Company, Schenectady 5, N. Y.***

GENERAL ELECTRIC

660-70

8
Ways
Model
HD-10
86.63 drawbar hp.
Six speeds forward, to 6.03 m.p.h.; two reverse, to 4.15. Weight: 62" tread, 21,000 lbs.; 74" tread, 21,600 lbs. Available with large idler.

Let the Outstanding Advantages of These AHEAD-OF-THE-TIME Tractors Boost Your Production and Cut Your Costs...as They Have for Thousands of Owners

1 **1,000-HOUR LUBRICATION** of truck wheels, support rollers and idlers. You operate six months on a 40-hour week basis with just *one lubrication* . . . instead of daily, or even weekly, attention. Think what this means in labor and lubricant savings . . . and in working time gained! Think of the safety factor, too—no costly damage by greasing neglect.

2 **GENERAL MOTORS 2-CYCLE DIESEL ENGINE** Rugged, simple, economical, "hanging-on" power. Smooth — every down stroke a power stroke . . . less wear and tear on tractor and operator. Far less power loss than other engines at high altitudes.

3 **INTERCHANGEABLE ENGINE PARTS** Nearly all of the GM engine wearing parts are interchangeable with each of the GM engines on the various models of A-C tractors and motor graders — no matter the size. Lowers parts investment, simplifies maintenance for Allis-Chalmers fleet owners.

4 **INSTANT STARTING** GM 2-cycle diesel engines start as easily as your automobile . . . and they *start* and *operate* on *diesel fuel*. No need to let 'em idle during work-stop periods — no unnecessary engine wear or fuel waste.

Ask any owner...or arrange for a demonstration with your Allis-Chalmers dealer ..."SEEING IS BELIEVING"

Big Reasons

they're so popular

Model

HD-7

60.10 drawbar hp.
Four speeds forward, to 5.00 m.p.h.; reverse to 1.89. Weight: 52" tread, 13,830 lbs.; 63" tread, 14,000 lbs. Available with large idler.

5 **FAST MANEUVERING** 2-cycle diesel tractors are well known for their fast-working ability — not only for quickly traveling from cut to fill, but for turning around instantly in their tracks . . . and for easy maneuvering in and around tight places — especially important on bulldozing. Time saved is money made!

6 **PROPER BALANCE** Weight, speed and power are positively balanced in A-C tractors, assuring top performance on every job — pulling, pushing, lifting.

7 **OPERATOR COMFORT** All these advantages mean operator satisfaction, too — resulting in more work done more easily. Besides — he has a big, wide, comfortable seat, cushioned back, arm rests, roomy platform, convenient controls, good vision.

8 **MATCHED ALLIED EQUIPMENT** Each Allied manufacturer, skilled in his own field, works in complete cooperation with Allis-Chalmers in designing and building auxiliary equipment.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Originator of the Torque Converter Tractor

How to Lower a High "Break-Even" Point

Eliminate this Needlessly High Cost

Industrial Eye Accident Costs UP *78½%

*SINCE 1939

Investigate the high costs of eye accidents and their cure when seeking ways and means to produce *more* profitably! Unlike steps taken to improve your plant, equipment and work processes . . . no large financial outlay is required, no human relations problems are created AND THE PAYOFF IS IMMEDIATE. (Records prove an eye protection program can pay for itself within 6 months.)

Your MSA Representative can show you case histories where annual savings amounted to sums in *five figures* after an AO Eye Protection Program was started. Ask him to call.

FACTS TO REMEMBER—*Average eye accidents cost industry over $5 per employed worker per year . . . cost over $328 per injured worker in compensation . . . are 98% preventable by goggles costing approximately $2.30.*

American Optical
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

Drop Bottom Car Users Report 87% Tonnage Bonus

IF your mine is mechanized, you may be able to get out 87% more coal by switching to drop bottom mine cars. Or, to turn it around, you may be able to get out the same tonnage with 53% fewer cars!

These are not mere claims. They are actual production figures, reported by 109 mines, producing 19% of the country's underground coal from mechanized mines, and using 41,387 mine cars of all types!

Basically, there is only one reason for the higher production of drop bottom mine cars. They prevent delays at the dumping point. Drop bottom cars dump-and-return faster, eliminating wasted minutes. A trip of fourteen A.C.F. Drop Bottom Mine Cars, for instance, can dump on-the-move, automatically, and be ready to return to the face... in 70 SECONDS!

Can your mine use 87% more coal hauling efficiency? Ask a nearby A.C.F. Sales Representative to show you how drop bottom cars can supply a substantial tonnage bonus in your mine. American Car and Foundry Company, New York
Chicago · St. Louis · Cleveland · Washington
Philadelphia · San Francisco · Pittsburgh · Huntington, W. Va. · Berwick, Pa.

a.c.f. DROP BOTTOM **MINE CARS** *for Greater Mining Efficiency*

SYMBOL OF

Low Cost Per Unit of Work

Whenever you see that Bethlehem reel, make a mental note. Remember it as a symbol of good wire rope and rope economy. That's what it means to thousands of users the country over. Sometimes they pay a little more for a Bethlehem rope, but this minor difference in first cost is more than offset by *lower cost per unit of work*—the only true yardstick of wire rope expense.

First cost—purchase price—can be highly deceptive as a measure of economy. The rope with the lowest price tag—offered as a "bargain"—may prove very costly in the long run. But this is a risk you do not take when you purchase Bethlehem wire rope.

Every foot of Bethlehem rope is quality merchandise, made carefully and conscientiously. When, after long service, a Bethlehem rope is finally retired, you will find that it has cost you very little for each unit of work it has done—for each drilling ton-mile, each yard of rock moved and loaded, each ton of coal hauled.

When you see a Bethlehem reel, let it remind you of all these things. Then, when it's time to order—order Bethlehem. You'll like the rope you find on that reel. It will serve you faithfully and well.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

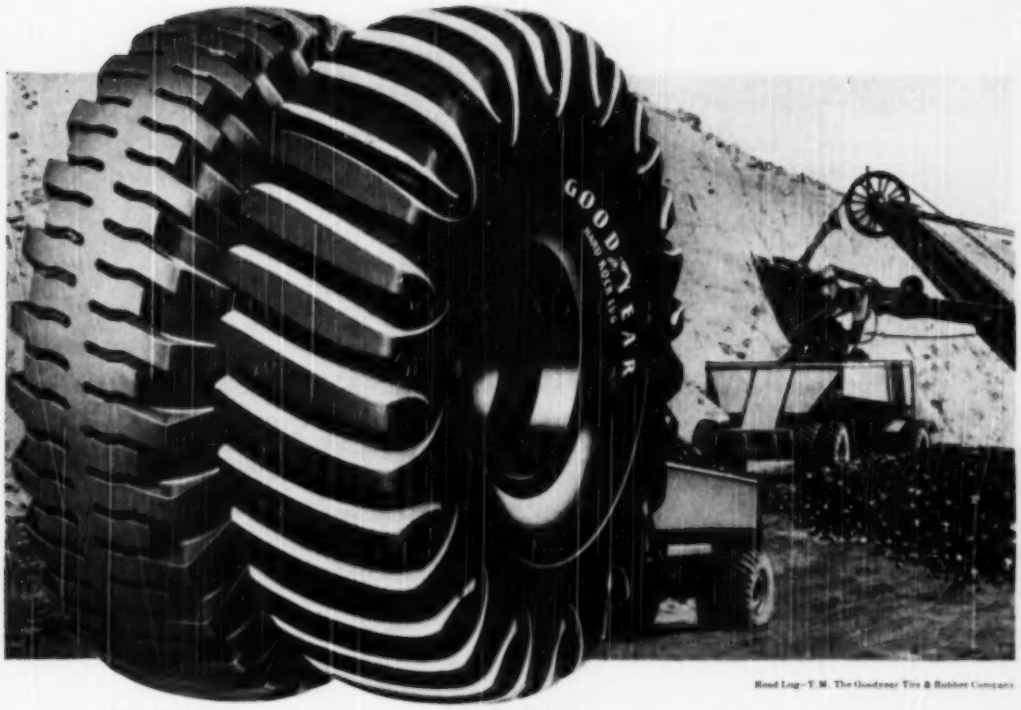
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

these tires slash coal-hauling costs

IN all types of coal hauling, experience has proved that these Goodyear lug tires provide longer tire life—lower tire costs. That's because Goodyear builds *special* tires to meet the specific needs of coal-hauling operations. Remember, to cut *your* tire costs, always BUY and SPECIFY Goodyear—*it pays!*



Road Lug—T.M. The Goodyear Tire & Rubber Company

ROAD LUG

For trucks that operate both OFF and ON the road this dual-purpose tire is best. Tough construction and special tread design provide super-traction off the road—more mileage on the road.

HARD ROCK LUG

For tire-bruising, heavy-duty off-the-road work this super-rugged tire is tops. Its tough armored carcass, extra-husky lugs assure more wear, better performance no matter how tough the going is.

We think you'll like
"THE GREATEST STORY EVER TOLD"
Every Sunday—ABC Network

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

CARBOLOY

Pioneer cemented carbide manufacturer in the United States
World's largest manufacturer of cemented carbides

Now the name to remember in coal-mining tools

YES, Carboloy is the name to think of, and remember, when you need coal-mining bits. Here are several important reasons why:

CARBOLOY, actively engaged in the development of cemented carbides since 1928, is the acknowledged leader in the carbide field—and is rapidly gaining equal prominence in the coal-mining industry.

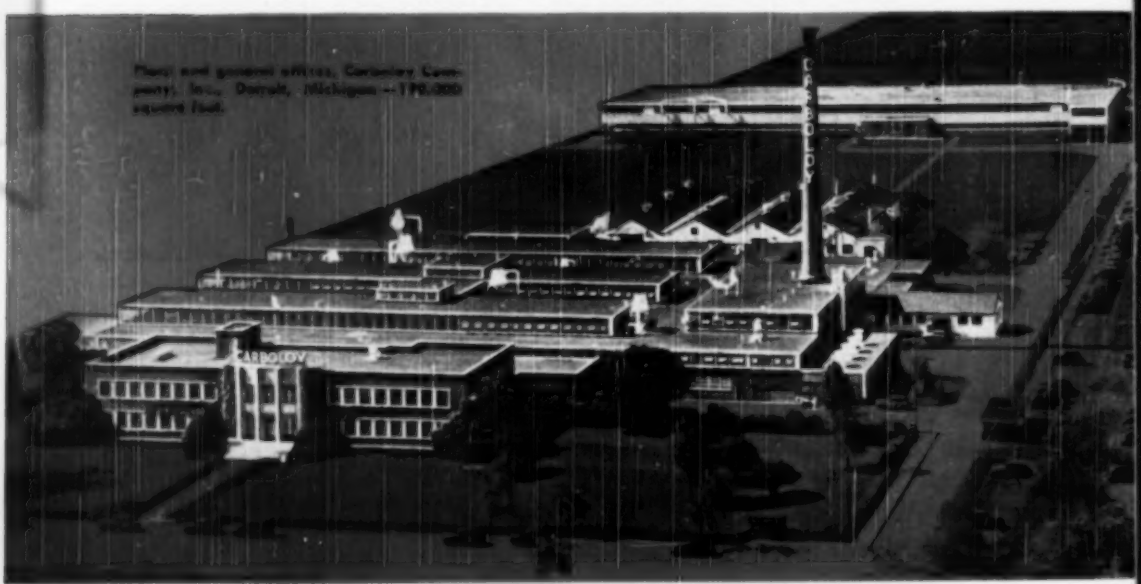
CARBOLOY, with the nation's largest and most complete engineering and research facilities devoted entirely to carbide improvement, offers you the latest improvements in coal-mining bits.

CARBOLOY, over a 21-year period, has built up the finest facilities available for mass production of cutting tools—and all these facilities are geared to producing better and more coal-mining bits for you.

CARBOLOY, with a Distributor Sales organization whose efficiency and scope equip it to handle the needs of an individual or an industry, offers you immediate delivery of any standard bit in any quantity from local stock.

With Carboloy cemented carbide coal-mining bits, you get better carbide tools—tools that will give you longer life and increased production. Check the line of Carboloy bits shown here. Read about all the outstanding features they offer you. Then you'll know why Carboloy is the name to remember for your bit needs.

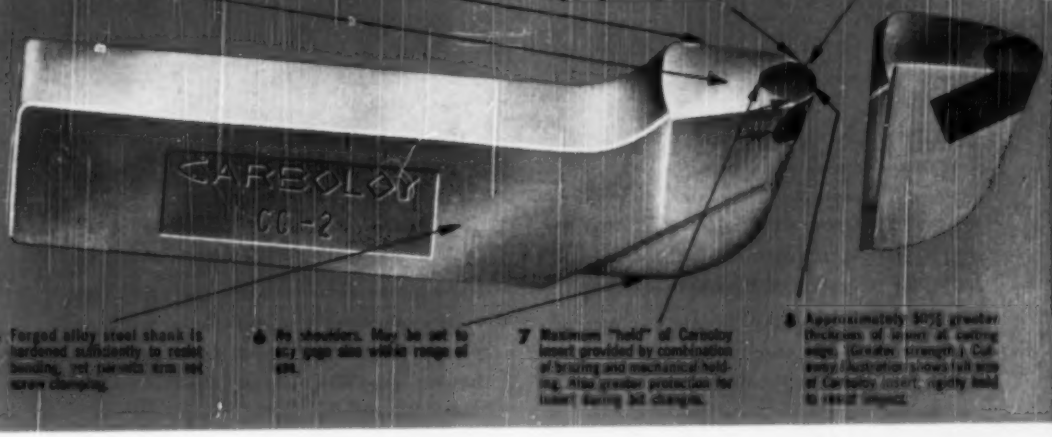
CARBOLOY COMPANY, INC. • 11130 E. 8 MILE BLVD., DETROIT 32, MICHIGAN



HERE ARE SOME OF THE CARBOLOY PRODUCTS FOR COAL MINING!

This Carboloy coal-cutter bit brings you improvements that spell new coal-cutting speed and efficiency, plus reduced sparking risk. It's ideal for any chains that accommodate ½" x 1" bits.

Carboloy's Improved Mining Machine Bits—8 Big Advantages!



1 Shank level with Carboloy insert to permit free, unimpeded flow of coal (eliminates "bag dust").

2 Less shank steel to grind when resharpening (yet adequate support for insert).

3 Less carbide to grind when resharpening. (Less lap and side draw.) This means faster grinding and greater tip economy.

4 Less sweet treatment for to smaller point (design) radius.

5 Forged alloy steel shank is hardened sufficiently to resist bending, yet tempered to give good screw clamping.

6 Its shoulders. May be set to any gage dim within range of use.

7 Maximum "hold" of Carboloy insert provided by combination of brazing and mechanical holding. Also greater protection for insert during bit changes.

8 Approximately 50% greater thickness of insert at cutting edge. (Greater strength.) Cutaway illustration shows full size of Carboloy insert, rigidly held to resist impact.

Carboloy's Improved Auger Drill Bits
for faster, easier drilling

Here's Carboloy's answer to the miner's problem of drilling coal. These improved drill bits, tipped with Carboloy cemented carbide—*the hardest metal made by man*—will slash your costs. For post, mounted and push drills.

Check these points on the improved Carboloy auger drill bit:

- **Maximum clearance and relief angles permit freer, faster cutting.**
- **Improved spiral prevents packing of coal cuttings.**
- **Uniform high-quality carbide throughout the entire tip. Assures uniformly longer bit life.**
- **Long tips of Carboloy cemented carbide permit many more regrinds.**

PLUS

- **Forged alloy steel shank—heat treated.**

Carboloy's Improved "Finger" Bit

Want real gouging action in that hard-to-take-hold-of medium ground? Then here's your bit—Carboloy's Improved "Finger" Bit for strip and underground mining and other medium ground drilling. This longer-lasting bit will fit any standard auger drill heads using ½" bits, and its extra wear will trim your mining costs. Here's what it offers:

- **Faster cutting due to larger clearance angle on shank.**
- **Drills more freely.**
- **Less pressure is required.**
- **Uniform high-quality carbide throughout the entire tip. Assures longer drill life.**

PLUS

- **Forged alloy steel shank—heat treated.**

CARBOLOY®
CEMENTED CARBIDE
FOR GREATER MINING ECONOMY

It's got what it takes *for the jobs that you've got*

OVERBURDEN or pay material—ore or coal—long hauls or short . . . here's a hauling unit that isn't choosy about the kind of work you give it. All it wants is to keep busy. With *power, ruggedness, dependability* and *big capacity* it will roll up for you great records on low-cost hauling.

It's a "Caterpillar" DW10 Tractor and matching Athey PD-10Q rock trailer that can move 15-ton loads of rocky stuff at a 24.5-mph. clip. On the job pictured below an average of six 8400-foot round trips are being made per hour—representing a total of about 720 tons of shot rock per 8-hour day.

If interested in greater profits through—

Fast stripping
Increased ore or coal production
Multiple-job hauling for full-time usage
Low fuel costs and easy operation

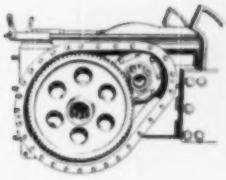
—you just can't beat an outfit like this. Behind it are a responsible manufacturer and a widespread, splendidly equipped dealer organization that can provide quick and efficient service at reasonable cost no matter where your jobs or headquarters are located. See your "Caterpillar" dealer. Meantime, USE THE COUPON—*now.*

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

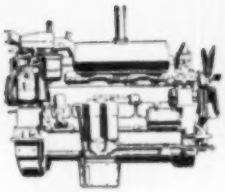
NOTE. DW 10s are also available with matching "Caterpillar" W 10 Wagons and No. 10 Scrapers.

Look under the hide

OF THE "CAT" DW10

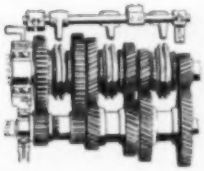


SPEEDS UP TO 24.5 MPH. Three complete ranges of speed are available with a choice of final drive gears. Many operators keep all three sets in stock to fit their DW10s to the job, ground conditions or haul distances. Differential-type rear end, combined with steering brakes, enables the DW10 to "walk" through soft spots on the fill. Full-floating drive axles are an assurance of dependable performance under the roughest of conditions.



ALL-"CATERPILLAR" BUILT. Undivided manufacturer responsibility! Engine, transmission, clutch and final drive—all are 100% "Caterpillar" built and designed for each other. The engine, 115 honest horsepower, is known the world over for its dependable and economical performance. Its own independent gasoline starting engine is itself started electrically, or can be started by hand in case of battery failure. The engine is the heart of *your* operations . . . use the best.

EASY SAFE OPERATION. One way to get high earthmoving production is to design equipment for safety and ease of operation. Four-wheel stability; hydraulic booster steering; selective-acting air brakes on the DW10 and trailed unit; hydraulically controlled spring-mounted seat and unexcelled visibility—these add up to all-important reasons why operators prefer DW10s.



QUALITY BUILT. Typical of the quality designed into the DW10 is the constant-mesh, easy-to-shift transmission. A gear-type pump forces oil over the upper shaft to lubricate effectively the transmission on any grade. To insure long life, a large replaceable filter element guards against destructive abrasive materials. Just one of the many features that can boost production for you.

EASY TO MAINTAIN. "Caterpillar" has always designed for ease of service. Fuel injection equipment that can be replaced like spark plugs, with no adjustments required; a metallic-lined double-disc flywheel clutch that can be removed without disturbing engine or transmission—these are just two of many reasons why owners report full satisfaction. Hundreds of well-equipped "Caterpillar" dealers, each within easy job distance, constitute another reason why DW10s boost hauling profits.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES

TRACTORS

MOTOR GRADERS

EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.

Dept. CA-1, Peoria, Illinois

Please send me your latest booklet, "The 'Caterpillar' Diesel DW10 in Action."

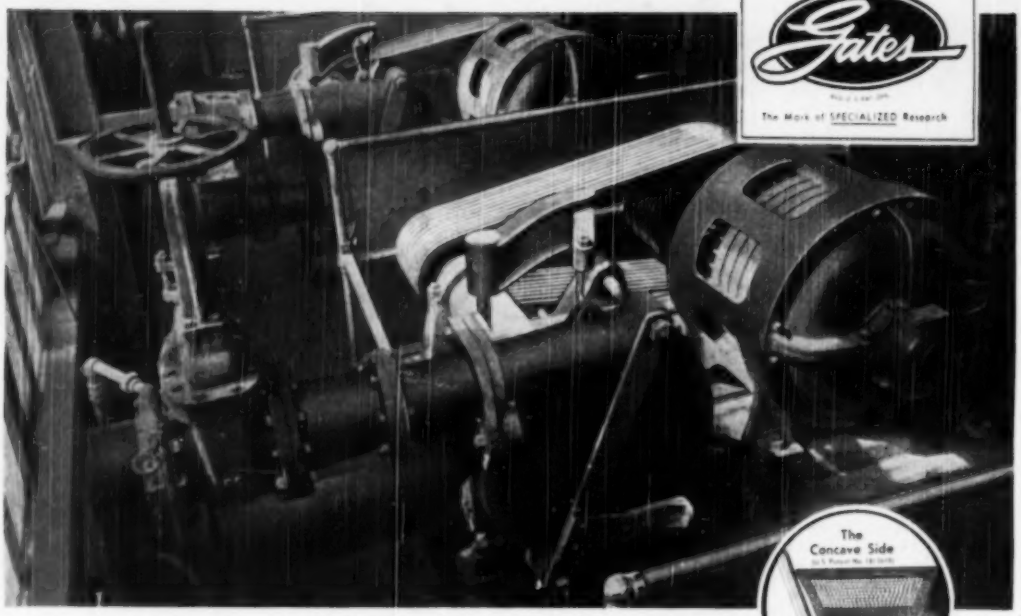
Name _____

Address _____

_____

Gates

The Mark of SPECIALIZED Research



These big sand pumps handle thickened slimes at the outlet of Miami Copper's 8,000,000 gallon thickener. Operators like the Gates Vulco Rope Drives because if anything happens to a pump and the drives get wet these V-Belts, which run in grooved sheaves, do not slip off. Also, a simple change in sheave size easily provides a considerable change in pump speeds.

Two Distinct *Savings* in *V-Belt Costs* Are *Yours* with Gates Vulco Ropes

A simple test that takes less than two minutes will save you many dollars in V-Belt costs. Here it is—

Have someone bend a V-Belt exactly as it bends in going around its pulley. As it bends, grip its sides with your fingers. You will *feel* those sides *change shape*. In a straight-sided V-Belt, the sides become *convex* as the belt bends. And note how the sides *bulge out*. (Figures 1 and 1A)

Now try the same test with a V-Belt that is built with the concave side. You will feel a change in shape—but a *different result!* The sides do not become *convex*. Instead, they become perfectly straight. *The bent belt now has a shape that exactly fits its sheave groove*—as shown in Figures 2 and 2A.

Two distinct savings result. *First*—There is no side-bulge to cause uneven wear. The sides press *evenly* against the V pulley and therefore wear *uniformly*—resulting in *longer life!* Second—The *full width* of the sidewall grips the pulley—thus carrying heavier loads without slippage—and this *saves belts* and also saves *power!*

When you buy V-Belts, be sure you get the V-Belt with the Concave Sides... the Gates Vulco Rope!

What Happens When a V-Belt Bends

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove.

Gates Vulco Rope with Concave Side.

No Side Bulge. Precise Fit in Sheave Groove.

C S 501

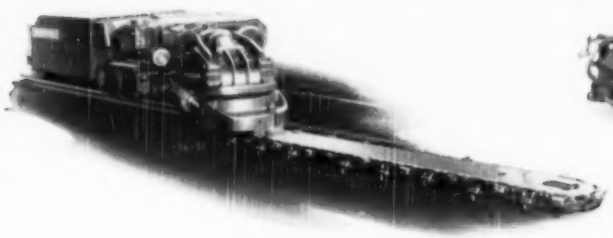
THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

JEFFREY

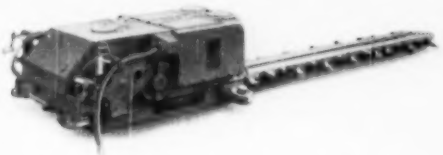
EQUIPMENT FOR COAL AND METAL MINES

FOR TRACK MINES



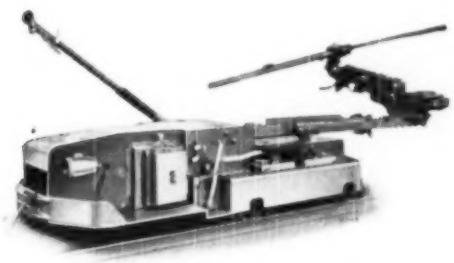
29-U UNIVERSAL CUTTER

A hydraulically operated, track mounted, Universal Cutter for cutting any place in the seam, including shearing. Only 33½" high above rails. Patented. Also licensed under Patent of E. C. Morgan, 1,953,325.



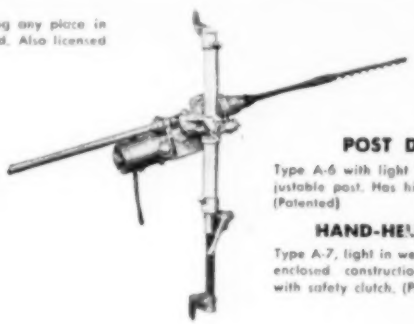
SHORTWALL CUTTERS

Series 35 in various types either 35 H.P. or 50 H.P. for conveyor mining or equipped with trucks.



56-A DRILLING MACHINE

Equipped with one or two drills mounted on hydraulically adjustable supporting arms which permit rapid drilling anywhere in the face.

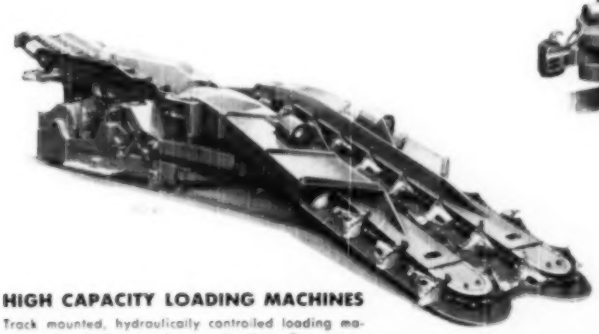


POST DRILLS

Type A-6 with light weight, easily adjustable post. Has high drilling speed. (Patented)

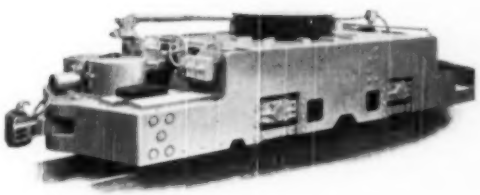
HAND-HELD DRILL

Type A-7, light in weight and of totally enclosed construction and equipped with safety clutch. (Patented)



HIGH CAPACITY LOADING MACHINES

Track mounted, hydraulically controlled loading machines for high capacity car loading. Two types: L-500 for low veins; L-600 for mines permitting the use of higher machines. (Patented)

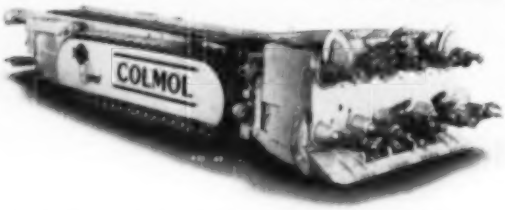


ELECTRIC LOCOMOTIVES

Built in a wide variety of types and sizes, for either trolley or storage battery operation. They feature "armor plate" steel frames, anti-friction journal boxes and motor axle suspension; handwheel, air, dynamic or hydraulic brakes.

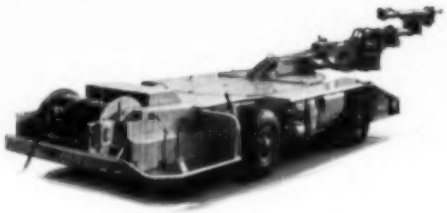
JEFFREY EQUIPMENT

FOR TRACKLESS MINES



"COLMOL" CONTINUOUS MINING MACHINE

Both cuts and loads from 3 to 5 tons per minute without the use of explosives. Mines an entire room 9½' wide, with varying heights, advancing the face 18" to 24" per minute. (Pat. applied for)



56-FHR DRILLING MACHINE

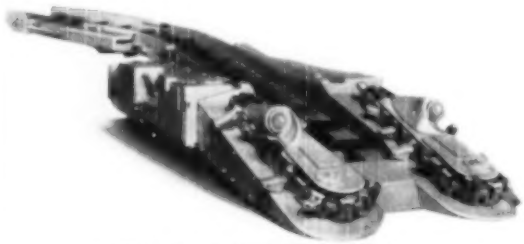
Has a drilling range of 13'-1¾" horizontally from center line of machine, and 6' 11½" vertically. (Patented)

70-UR UNIVERSAL CUTTER

Cuts any place in the seam, including shearing, and is completely hydraulic in operation. Furnished in 30" and 34½" heights, with single or dual drive wheels. (Patented. Also licensed under patent of E. C. Morgan, 1,953,325)

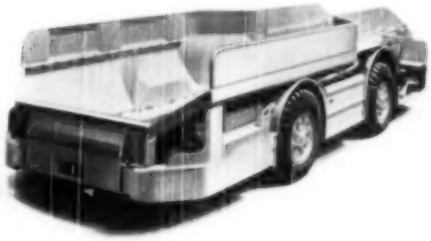
SHORTWALL TRUCK

For transporting any make of SHORTWALL Cutter. Tilting pan facilitates loading and unloading machine. Can also be used for transporting supplies. (Patented)



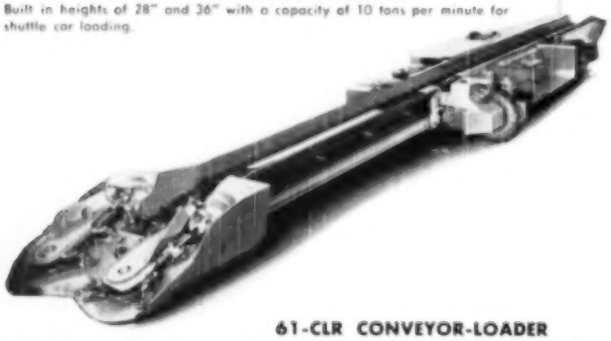
CRAWLER MOUNTED LOADERS

Built in heights of 28" and 36" with a capacity of 10 tons per minute for shuttle car loading.



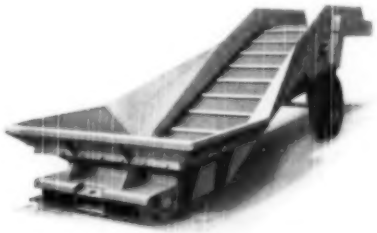
CABLE REEL SHUTTLE CARS

Built in basic heights of 30", 35" and 43" with two wheel drive and two wheel steering, or four wheel drive and four wheel steering. (Patented)



61-CLR CONVEYOR-LOADER

Designed especially for conveyor mining, this machine has an extensible gathering head. Discharge end is pivotally anchored over conveyor while loader moves in an arc across face. (Pat'd.)



72-AR ELEVATING CONVEYOR

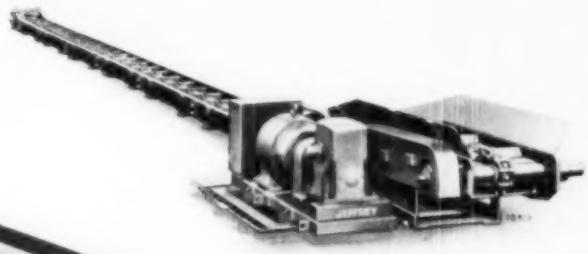
For use with shuttle cars or conveyors. Discharge height is adjustable to suit car height. Can also be furnished with steel flanged wheels for riding rails, or with implement type wheels.

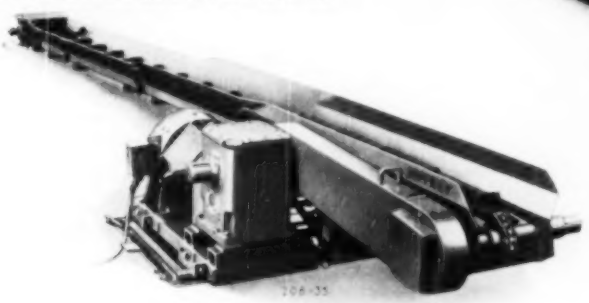
FOR COAL AND METAL MINES

UNDERGROUND CONVEYORS

SECTIONAL CHAIN CONVEYORS

Available in many standard and special types for horizontal, inclined and elevating operation to suit every mining condition. Our engineers can recommend the types best suited to coordinate your underground operations into a smooth operating system. (Patented)

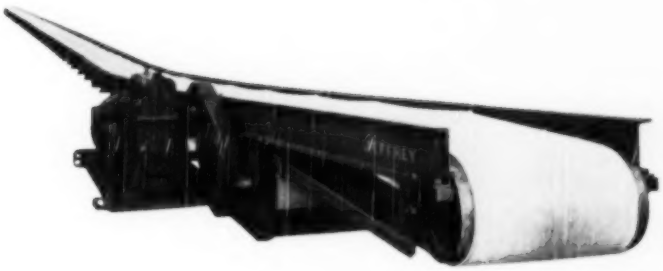




Above view shows a Jeffrey Type 61-HG Face Conveyor. View at left shows the Jeffrey Type 61-AM Room Conveyor with patented diverging head which prevents lumps from wedging under chain as it passes over head sprocket.

SECTIONAL BELT CONVEYORS

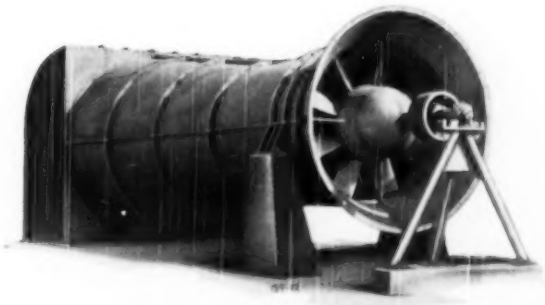
Jeffrey Sectional Belt Type Underground Conveyors are available in 26", 30" and 36" widths for capacities ranging from 2 tons per minute up to 10 tons per minute. Where the average grade against the load does not exceed 3 per cent, these conveyors may be extended to a maximum length of 2500 feet with a single drive unit located at the discharge end. (Patented)



FANS AND BLOWERS

Jeffrey "AERODYNE" Mine Fans provide the highest efficiency in mine ventilation, insuring a continuous and abundant supply of fresh air under every operating condition. Built in a range of sizes to meet capacity requirements up to 500,000 cfm. (Patented)

Various types of Jeffrey Portable Blowers are available for blowing fresh air to the dead end of an entry or similar place through flexible tubing. The "AERODYNE" midget type is shown below. (Patented)

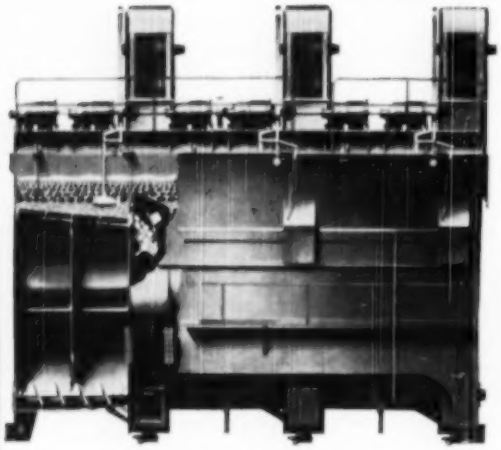


Type 8H96 "AERODYNE" Mine Fan

"AERODYNE" Midget Blower

JEFFREY EQUIPMENT FOR COAL AND METAL MINES

COAL PREPARATION EQUIPMENT



Three Compartment Baum Jig (Patented)

COAL WASHERS

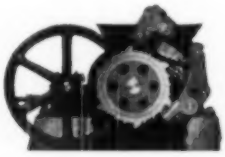
Jeffrey Baum and Diaphragm Jigs represent the most effective high capacity mechanical coal cleaning units on the market today. These units are of proved design and have demonstrated their worth in years of service in all the major American coal fields. Both can be furnished in single or multiple compartments.

The Baum type is designed for capacities up to 700 T.P.H. of 7"x0" coal and the Diaphragm for capacities up to 200 T.P.H. of 6"x0".

Also Unit Washeries for washing up to 200 T.P.H. These units combine a Diaphragm Jig with a self-contained de-watering and sizing screen and water clarifying tank.

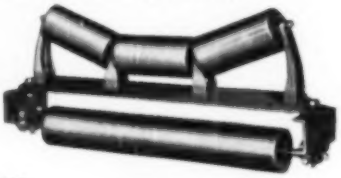
CRUSHERS

"FLEXTOOTH" Crusher (pat'd)

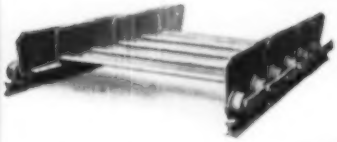


Single Roll Crusher

The line of Jeffrey Crushers includes machines of various types to meet all requirements in the reduction of coal, coke, etc. to a desired product size. Each is available in a wide range of sizes to suit size of feed and capacity requirement.

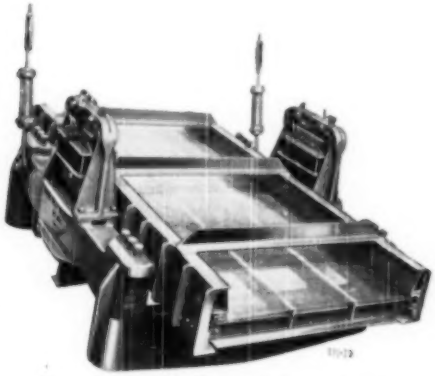


Roller and Ball Bearing Belt Idlers for belt widths from 14" to 60".



Steel Apron Conveyors for conveying, feeding, picking table and loading boom service.

Electric Vibrating Feeders for absolute control over feeding operations. Used for feeding jigs, crushers, etc.



Single or Multiple Deck Electric Vibrating Screens
Gravity or Conveyanscreen Types

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912 N. Fourth Street Columbus 16, Ohio

SALES OFFICES

BALTIMORE, 2
BIRMINGHAM, 3
BOSTON, 16
BUFFALO, 2
CHICAGO, 1
CINCINNATI, 2
CLEVELAND, 15
DENVER, 2
DETROIT, 32
HARLAN, KY.
HOUSTON, 1
HUNTINGTON, 17
JACKSONVILLE, 2
MILWAUKEE, 2
NEW YORK, 7
PHILADELPHIA, 3
PITTSBURGH, 22
SALT LAKE CITY, 1
ST. LOUIS, 1
EDMONTON, 2

SERVICE STATIONS

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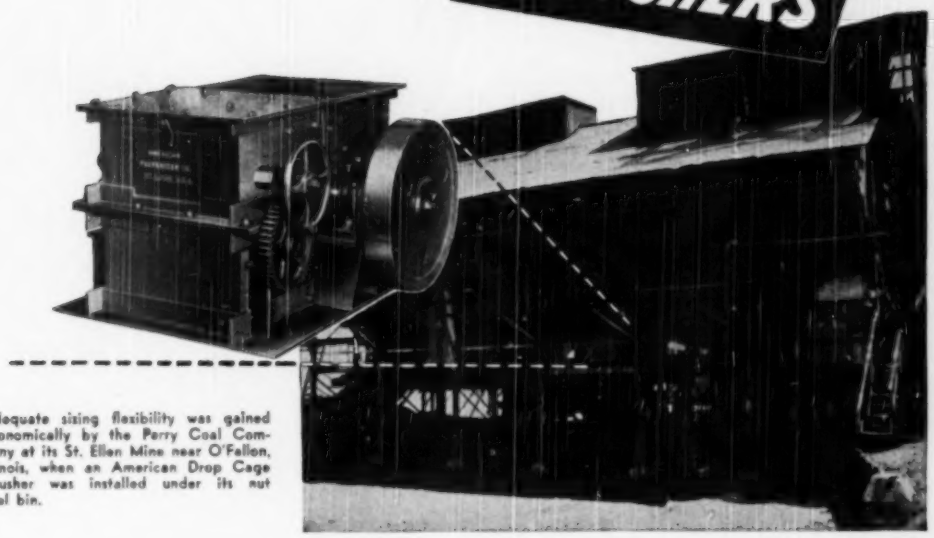
10 WEST VIRGINIA: BECKLEY — CAMDEN ON GAULEY — LOGAN — MOUNDSVILLE — WELCH

FOREIGN PLANTS

JEFFREY MFG. CO., LTD., MONTREAL, QUE., CANADA
BRITISH JEFFREY-DIAMOND, LTD., WORKSOP, ENGLAND
JEFFREY-GALION (PTY) LTD., JOHANNESBURG, SOUTH AFRICA

GET FLEXIBILITY of SIZING plus UNIFORM HIGH TONNAGE install AMERICAN Drop Cage CRUSHERS



Adequate sizing flexibility was gained economically by the Perry Coal Company at its St. Ellen Mine near O'Fallon, Illinois, when an American Drop Cage Crusher was installed under its nut coal bin.

Rapidly fluctuating market needs is no problem to operators where flexible American Drop Cage Rolling Ring Crushers are on the job. They're designed especially for the secondary step in the full range of reduction to add flexibility to coal preparation.

EASY, ECONOMICAL TO INSTALL—Compact Americans are engineered to occupy the smallest space possible, right under the bin, with extremely low headroom requirements including by-pass — assuring minimum installation costs without extensive preparation plant alterations.

HIGH TONNAGE — LOW OPERATING COST—Doubly adjustable for flexibility of sizing to meet each day's market conditions, American Ring Crushers reduce coal through cleavage instead of blunt shattering force, giving a controlled ratio of fines — high tonnage output of uniform marketable sizes. And, by reducing at low, power-saving speeds, Americans offer additional savings in operating costs.

With capacities from 50 to 500 TPH, there's a type and size of American that's custom-built to make your coal marketing more flexible, more profitable.

Get the facts—send for Coal Crushing Bulletin.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.

FOR RUGGED DIGGING STRENGTH

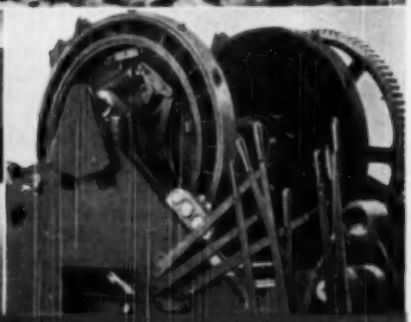
FOR BIG YARDAGE OUTPUT...

Steady production day in, day out, on your toughest excavating work, you can't afford to overlook the many cost-cutting advantages of this rugged, heavy-duty Koehring 605 shovel.

Heavy-duty rock boom of rigid box design is extra deep below shipper shaft, withstands the digging twists and strains of heaviest shovel work. Shipper shaft mounted on top gives still greater strength in the deep mid-section. Heavy steel rubbing plates protect boom against wear from dipper sticks. Boom foot is massive, wide . . . provides a solid base for heavy-duty digging.

Shock-absorbing boom mount . . . fast operating speeds . . . big 1½ yard dipper . . . power-operated clutches, all help keep production high, costs low. Check, too, how this 605's compact, accessible machinery arrangement simplifies adjustments, lowers maintenance costs, and increases work-time. For complete facts, see your Koehring distributor for today. Other Koehring heavy-duty sizes: ¾-yard 304, and ½-yard 205.

KOEHRING HEAVY DUTY



HEAVY-DUTY DIPPER is built for long-lasting service in the toughest digging . . . has exceptionally thick, reversible teeth, big pins, manganese bushings . . . is all welded for extra strength, less

"SPOON-SHAPED" SHOCK ABSORBERS heavy coil springs, one on each side of boom foot, cushion jars of hard rock handling . . . protect entire shovel attachment without sacrificing rigidity. Pocket on the

180 lb. NORMAL LEVER PULL . . . Koehring power clutch does the heavy work . . . supplies 90% of the effort when operator uses this big 37" dipstick. Average 7 lb. lever pull reduces operator fa-

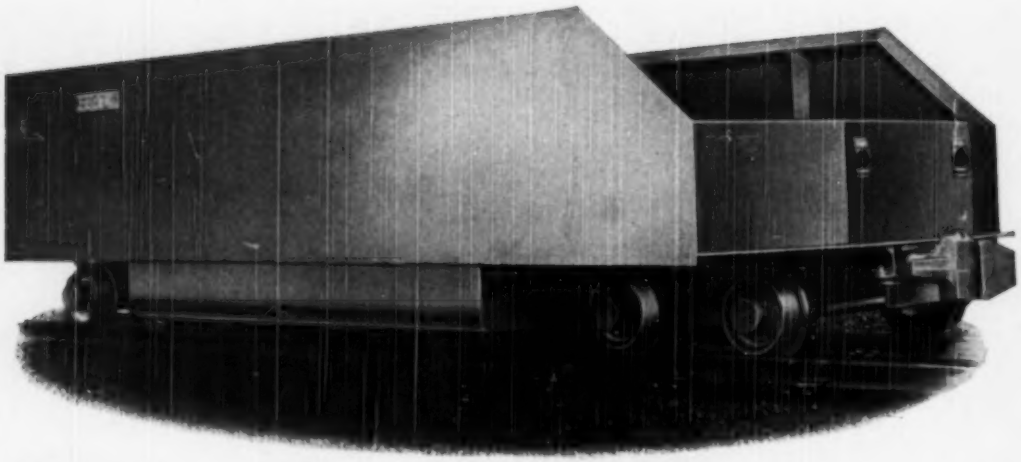
. . . USE KOEHRING HEAVY-DUTY

1½ YD. 605

FAST-SHUTTLING SCRAPER FOR LONG HAULS ON YOUR OFF-HIGHWAY HAULS

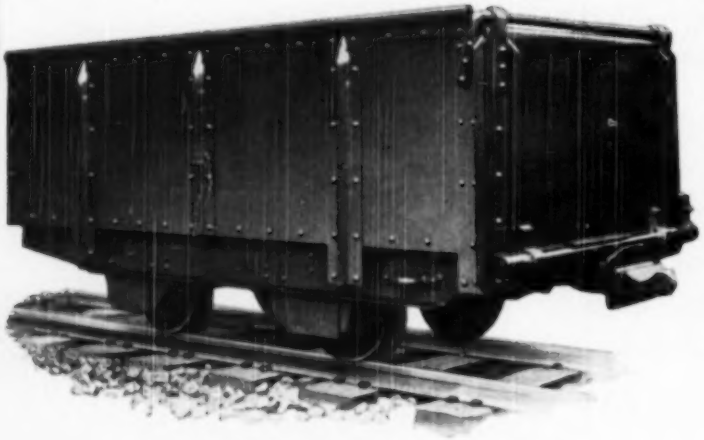
KOEHRING COMPANY

Milwaukee 10, Wisconsin



Sturdy and Strong

...because they're STEEL



When specified, these and other types of cars can be built of Bethlehem's Mayari R—a low-alloy, high-strength, corrosion-resisting steel

When Bethlehem engineers a mine car, you can bank on its being one of the ruggedest things on wheels. Bethlehem builds its cars of steel and builds 'em strong—doesn't skimp.

Shown here are two widely different types—an eight-wheel, ten-ton job with all-welded body, for bituminous mines; and a sturdy four-wheeler for use in the anthracite fields. Each has been highly successful in service. The two are good examples of what Bethlehem can turn out.

Whether you want end-dump or rotary-dump, high- or low-side cars, let us help you plan them. From blueprint to finished product, you can rely on Bethlehem for a job well done.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

These 7 Great Features Add Up To

LONG V-BELT LIFE

1 *Powerful Cord Structure* built up of hard-twisted, high tensile strength cords, impregnated with live rubber compound to prevent chafing and heating.

2 *Thick, Resilient Cushion* of rubber supports cord structure at correct pitch line . . . absorbs shocks . . . helps dissipate heat.

3 *Tough, double-wrapped cover* of long staple fibres, bias cut for elasticity and impregnated with rubber. Protects cords . . . seals out dust, grit, moisture.

4 *Extra Stiffening Plies* of heavy fabric and rubber help keep the belt square in the groove.

5 *Precision Molded And Cured* in accurate steel dies. Gives belt the *straight* sides necessary to provide the bulging gripping action that all V-belts need.

6 *Every Belt Carefully Weighed* and inspected during construction. Assures perfect balance and uniformity.

7 *Accurate Set Matching* . . . Every finished belt measured while running under load. *Texrope* multiple V-belts are matched in sets to assure uniform load on each belt.

COMPLETE V-BELT SERVICE

Get everything you need for your V-belt drives . . . V-belts, standard and variable pitch sheaves and speed changers . . . from one reliable source. 144 page *Texrope* Pre-engineered Drive manual covers 90% of requirements. Get your copy today from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956. Also in Sweet's.

ALLIS-CHALMERS, 968A SO. 70 ST. MILWAUKEE, WIS.

Super-7 *Texrope* V-Belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. A-2836

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

Texrope and *Super-7* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

users say

G. E.'S NEW ALL-PURPOSE* INSULATING VARNISH G-E 9574

Mr. J. Lindborg

From all parts of the country, enthusiastic reports are pouring in from users of G. E's new general-purpose varnish G-E 9574.

Here's a typical statement from J. Lindborg, owner and operator of AAA Electric Motor Service, Atlanta, Ga.

"Our experience has been that this varnish is as good as G. E. claims. It gives a good coat on every type of wire, bakes easily and dries to a tough coating that stands up perfectly in service. Also, this varnish works excellently with all types of coated wire and does not damage the insulation. We like the thinner, petroleum spirits, since it is cheap and can be purchased locally.

"During the two years we have been using this varnish we have had no complaints from any of our customers concerning our work."

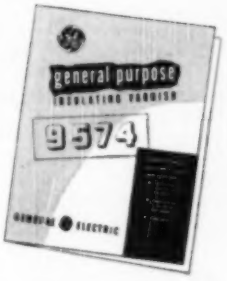
IF YOU HAVEN'T YET TRIED G-E 9574, get in touch with your local G-E Distributor, or write for our new bulletin to Section 26-12, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

..."bakes easily"*

..."on every type of wire"

..."stands up perfectly in service"

*G-E 9574 gives excellent results on all types of coils except extra-high-speed armatures. It is one of G. E.'s complete line of electrical insulating materials.



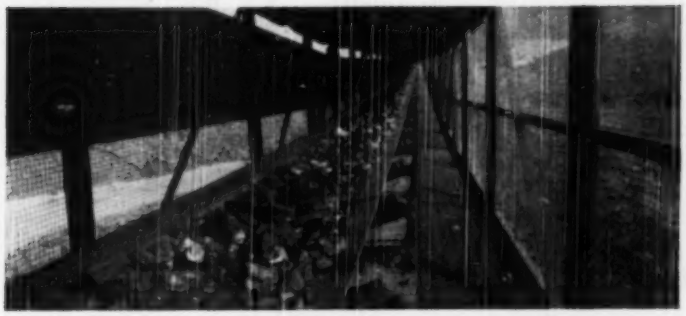
You can put your confidence in

GENERAL ELECTRIC

CD10-M6

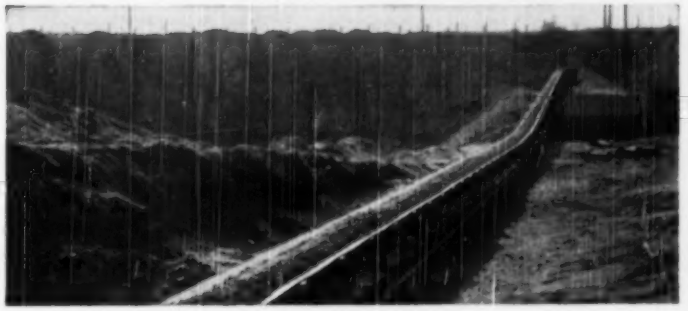
For heavy-duty conveyors . . .

IT'S TIMKEN...



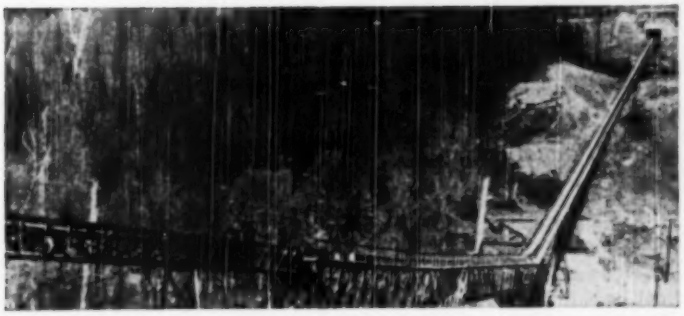
FOR over 25 years almost every heavy-duty conveyor — like most heavy duty equipment throughout industry — has relied on Timken® tapered roller bearings for long life and trouble-free performance. For example, The Blue Diamond Coal Company installed this Stephens-Adamson belt conveyor with 476 Timken bearing equipped idlers in 1930 —and at last report they haven't had to replace a bearing yet!

AND TIMKEN...



TIMKEN bearings are first choice for tough conveyor jobs like this Jeffrey Belt Conveyor installation used for long-distance sand hauling. Timken bearings provide maximum capacity for radial and thrust loads in any combination. Idlers turn freely, belt wear is reduced to a minimum. Effective seals keep lubricant *in*, dirt and moisture out. Lubrication and maintenance time is negligible.

AND TIMKEN® AGAIN!



AND here's one of the latest Timken-equipped jobs—a 1,485 foot Robins conveyor at The Gauley Mountain Coal Company's Williams River Mine. It's another addition to the thousands of miles of heavy-duty conveyors that roll on Timken bearings. There's no other bearing with so much to offer, no other bearing so fully proved. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Whenever the going's tough industry turns to

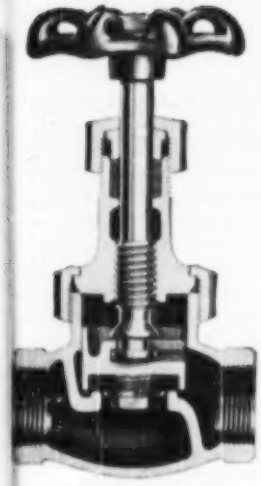
TIMKEN

TAPERED ROLLER BEARINGS

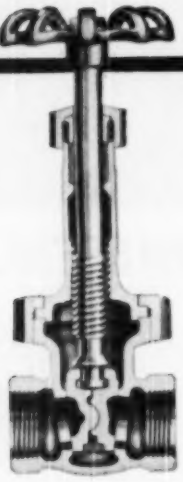
Typical application of Timken tapered bearings for conveyor idlers.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION

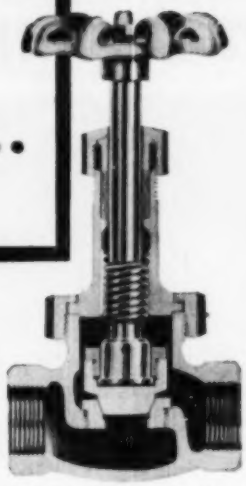
Walworth bronze valves...



Walworth No. 95 Globe Valve
Re-New-Disc



Walworth
No. 29 Gate Valve



Walworth No. 225P Globe Valve
500 Brinell Seat and Disc

built to give dependable trouble-free service on all recommended jobs

Walworth No. 95 Bronze Globe Valves (Angle Type: No. 96) are recommended for service where throttling is not required. They are rated at 150 psi working steam pressure, 500F; 300 psi cold water, oil or gas. The improved renewable disc and lock-on, slip-off disc holder — an original Walworth development—saves time and trouble. This valve can be repacked under pressure when fully opened. All parts are designed to give maximum service and strength.

Walworth No. 29 Bronze Gate Valves are rated at 200 psi working steam pressure, 550F; 400 psi cold water, oil and gas. These valves have rising stems and integral seats. Sizes 2-inch and smaller have union bonnets; sizes 2½ and 3-inch have bolted bonnets. Valves up to and including ¾-inch have solid wedge discs; 1-inch and larger have split wedge discs. These valves can be repacked under pressure when fully opened.

Walworth No. 225P Bronze Globe Valves (Angle Type: No. 227P) are rated at 350 psi working steam pressure, 550F; and 1000 psi non-shock service on cold water, oil and gas. The stainless steel, plug type seat and disc — heat treated to 500 Brinell — can be closed on sand, slag, scale and similar floatage, without injury to the seating surfaces. They are the longest wearing, TOUGHEST bronze valves you can buy.

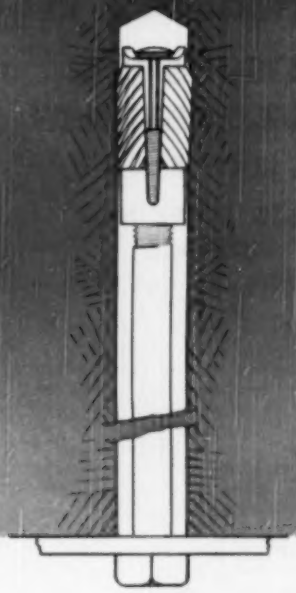
For full information about Walworth Quality Bronze Valves, see your Walworth distributor, or write:

WALWORTH
valves and fittings
60 EAST 42nd STREET NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

NEW

O-B EXPANSION SHELL AND PLUG FOR ROOF BOLTING!



- Develops full tensile strength of ¾ and ⅝-inch bolts or rods.
- Has double the expansion of standard expansion shells.
- Quickly and easily installed.
- Expansion unit does not have to bear against top of hole.
- Used with bolts, allows bolt-head to be flush with plate--with rods, can be positioned to provide minimum roof projection.
- For complete information and installation instructions, just fill in the coupon below.

Ohio Brass MANSFIELD, OHIO

FOR MORE INFORMATION

OHIO BRASS COMPANY, MANSFIELD, OHIO

I'd like further information on the new O-B Expansion Shell and Plug for roof bolting. Please send me a copy of bulletin 858-M.

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Here's The Way To More Egg Production

FAMOUS U. S. ISSUED PATENTS

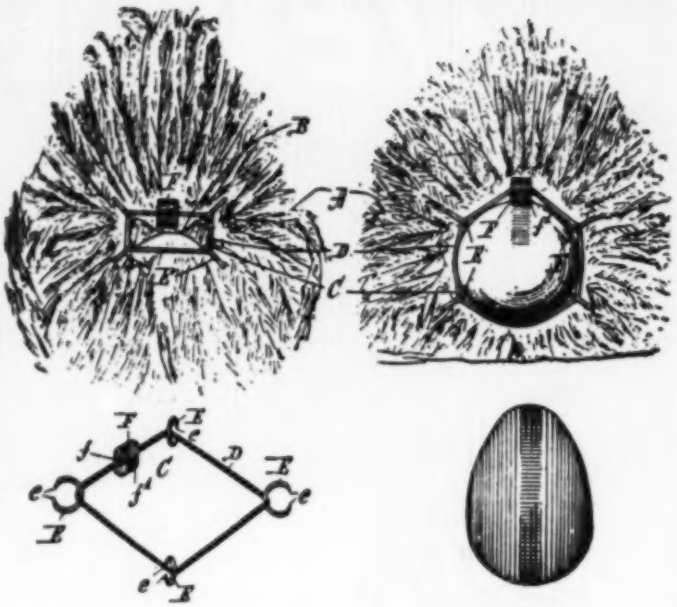
NO. 12 OF A SERIES

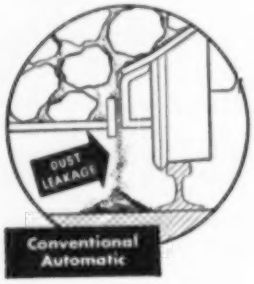
EGG MARKING DEVICE

No. 970,074 Sept. 13, 1910

"... The Primary object of my invention is the production of an egg-marking-device bearing a marking-element or element whereby the eggs laid by the hen to which the marking device is attached will be marked in a distinctive manner and whereby the laying capacities or qualities of each hen in a hennery can be easily ascertained. Another object of my invention is the provision of a marking-device of the character which can be easily attached to the vent of a hen so that it will always be in place for marking an egg laid by said hen."

(Language inside quote marks taken directly from U. S. Patent.)





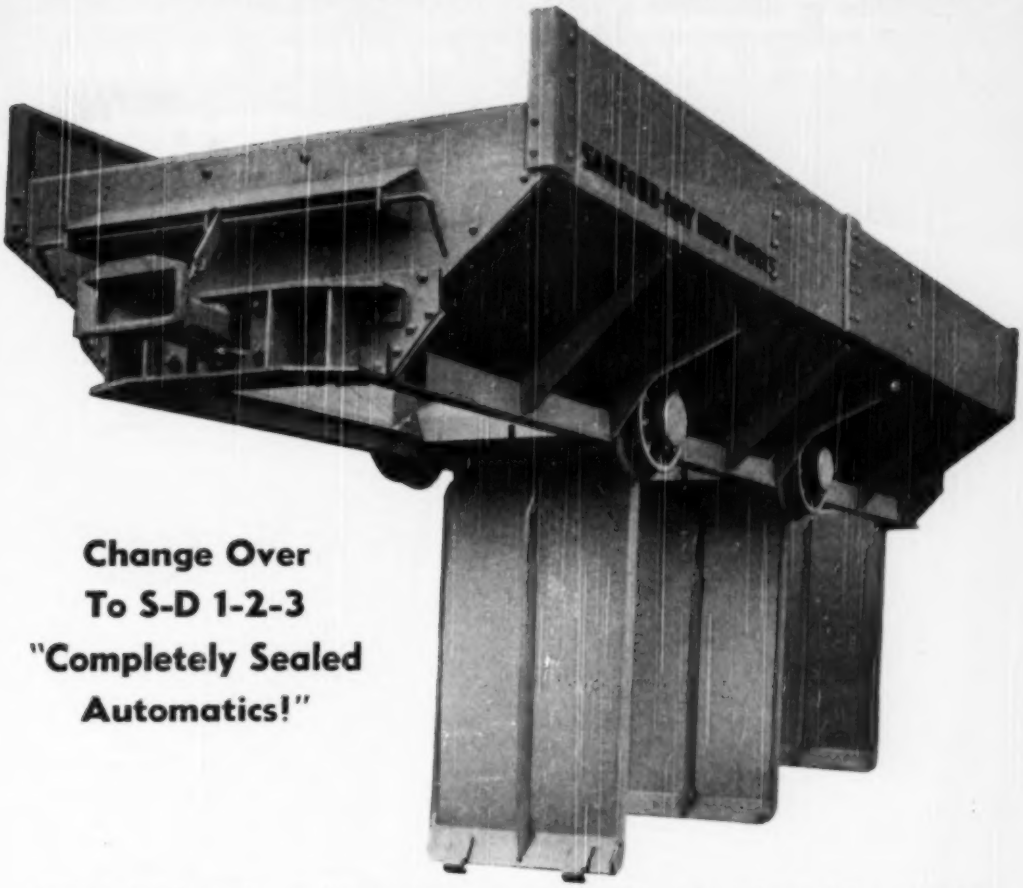
S-D "Automatics" Completely Sealed Against Dust Leakage

S-D "Automatics" have always led the field but now they're better than ever because they are completely sealed against coal dust leakage. The sides of the car have been extended inside to form a "dust-roof" over the clearance space between the drop-bottom door and car frame. In the top circle at left the conventional car construction is shown. As the car moves along the tracks, coal dust shakes down toward the bottom. When it reaches the unprotected space, it dribbles through onto the track bed, accumulating until it constitutes a health and safety hazard that must be removed. In the circle at lower left, the big advantage of the "dust-roof" in our SAFETY SEALED construction is clearly shown. As car vibrates the dust down the side of the car, it is carried across the open space by the "dust-proof" and deposited in the bottom of door to be dumped in the bin with the other coal. Seals are provided also at wheel hoods to insure a POSITIVE SEAL against any coal dust leakage.

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. Knoxville 9, Tenn.

Here's The Way To Top Coal Production



Change Over To S-D 1-2-3 "Completely Sealed Automatics!"

In all industries today, and particularly in coal mining, modern equipment is vital for minimum production costs . . . maximum profits. Smart operators are steadily replacing obsolete mine cars with S-D 1-2-3 "Automatics."

These cars speed up production from mine to tipple. Cars are dumped on the move, automatically, with our under-the-car unlatching device. For safety and dependability two independently operated hooks are unlatched to let the doors drop. The 1-2-3 action of doors lays the coal down gently. This means less coal breakage.

Now, with the patented feature of sealing against dust leakage, Sanford-Day still maintains its leadership in saving money for operators. You can cut labor costs—cut maintenance costs—cut track clean-up costs—and save time by installing S-D "Safety Sealed Automatics" . . . the most effective, most economical mine car ever built!

20 Car loads of "Automatics" from—

SANFORD-DAY IRON WORKS, Inc. • Knoxville 9, Tenn.

CARDOX

THE NON-EXPLOSIVE MINING METHOD

THESE 182 OPERATORS *Are Now Using* THE NON-EXPLOSIVE MINING METHOD

WEST VIRGINIA

Alqoma Coal and Coke Company (3)
American Coal Company (2)
Ames Mining Company (2)
Brule Smokeless Coal Company
Carbon Fuel Company
Clear Creek Coal Company (2)
Crozer Coal and Coke Company
I. W. Davis Coal Company
Delmont Fuel Company
Eleanor Coal Company
Gay Mining Company (2)
Dorothy Gordon Coal Company
Gulf Mining Company
Hoylman Coal Company
Hutchinson Coal Company
Island Creek Coal Company
Johnstown Coal & Coke Company (4)
Koppers Coal Division
Lamar Collieries Company
Leckie Smokeless Coal Company
Mariana Smokeless Coal Company
New River Company
Nicholas Webster Coal Corporation (5)
Pardee and Curtin Lumber Company
Pecks Run Coal Company
Premier Pocahontas Collieries
Raine Lumber and Coal Company (4)
Raleigh-Wyoming Mining Company
Red Jacket Coal Company
Richwood Sewell Coal Company
Rupert Smokeless Coal Company
Sycamore Coal Company
Tioga Coal Corporation (4)
Truax-Traer Coal Company
United Pocahontas Coal Company
Webb Coal Mining Company
West Gulf Collieries
Weyanoke Coal and Coke Company
Winding Gulf Collieries
Wood Coal Company

VIRGINIA

Blackwood Fuel Company, Inc. (2)
Clinchfield Coal Corporation (2)
Coal Processing Corporation
Jewell Ridge Coal Corporation
Kentucky-Darby Coal Company
Page Pocahontas Coal Corporation (2)
Sycamore Coal Corporation
Virginia Harlan Coal Company

KENTUCKY

Bell & Zoller Coal & Mining Company (2)
Bell Coal Company
Big Jim Coal Company (2)
Black Star Coal Corporation
Blue Bird Mining Company
Blue Diamond Coal Company
Cairnes Coal Company
Cinderella Coal Corporation
Correale Coal Mining Corporation
Creech Coal Company
W. G. Duncan Coal Company, Inc.
Elkhorn Coal Company (2)
Fourseam Coal Corporation
Jewell Ridge Coal Corporation
Kentland Elkhorn Coal Company
Kentucky Collieries Company
Kentucky Ridge Coal Company
Knott Coal Corporation
Luzerne-Graham Mining Corporation
Marlowe Coal Company (2)
Mary Gail Coal Company
Norton Coal Corporation
Smith Coal Company
Stoker Coal Company

TENNESSEE

Rennebaum Coal Company
Straight Fork Coal Company

PENNSYLVANIA

Adamsburg Coal Company
The Berwind-White Coal Mining Company
Butler Consolidated Coal Company
Charles E. Campbell
Evans Coal Company
Moffit Coal Company (7)
Pittsburgh Coal Company
Pittsburgh Consolidation Coal Company
Republic Steel Company
I. L. Sager Coal Company
Wallwork Coal Company
Washington Coal Company (2)
Westmoreland Coal Company

CARDOX CORPORATION

ANNUAL *Roll Call*

OHIO

The Farm Bureau Cooperative Association Inc.
Hanna Coal Company of Ohio ..... (2)
The Hocking Valley Mining Company
Lorain Coal & Dock Company ..... (2)
The David Z. Norton Company
Pittsburgh Plate Glass Company
Powhatan Mining Company
Warner Collieries Company

ILLINOIS

Bell and Zoller Coal and Mining Company .. (5)
Blue Bird Coal Company ..... (3)
Bugos-White Coal Company
Carmac Coal Company
Chicago, Wilmington & Franklin Coal Co. ... (3)
The Consolidated Coal Company ..... (3)
Dering Coal Company
Franklin County Coal Corporation
Freeman Coal Mining Corp.
Mid Continent Coal Corporation
Moffat Coal Company
Edward Mohn & Son ..... (5)
Old Ben Coal Corporation ..... (6)
Peabody Coal Company .....
Pschirrer & Sons Coal Company ..... (3)
Sahara Coal Company .....
Sparta Coal Company
Truax-Traer Coal Company
Union Colliery Company
Wilkins Coal Company

INDIANA

Black Hawk Coal Corporation ..... (2)
Walter Bledsoe & Company .....
Enoco Collieries Company
Glendora Coal Company
Ingle Coal Corporation
Knox Consolidated Coal Corporation ..... (2)
Linton Summit Coal Company
Pandora Coal Corporation
Princeton Mining Company
Pyramid Coal Corporation
Rudolph Oil and Coal Company
Snow Hill Coal Corp.
Standard Coal Company
Templeton Coal Company
Three Coal Company ..... (2)
Wolf-Koenig Corporation .....

OKLAHOMA

Buck Creek Mining Company
Davis & Swindle
Premium Smokeless Coal Company
Reliance Smokeless Coal Company

COLORADO

Bear Coal Company
Black Diamond Fuel Company
Boulder Valley Coal Company
Calumet Fuel Company
Canon Black Diamond Coal Company ..... (2)
Canon Monarch Coal Company .....
Canon National Coal Company ..... (2)
Clayton Coal Company ..... (3)
Colorado Fuel & Iron Corporation .....
Colowyo Coal Company
Consolidated Coal & Coke Company
W. D. Corley, Jr.
Cribbs-Goodman Coal Company
Domestic Coal Company
Double Dick Coal Company
Dry Creek Coal Company
Graden Coal Company
Griffith Coal Mining Company
Imperial Coal Company
Imperial Smokeless Coal Company
Juanita Coal & Coke Company
Keystone Coal Company
Liley & Merlino
Louisville Lafayette Coal Company
McNeil Coal Corporation
Oliver Coal Company ..... (2)
William E. Russell Coal Company .....
Tomahawk Coal Company
Vento Coal Company ..... (2)
Victor-American Fuel Company .....

MONTANA

Bair-Collins Coal Company
Brophy Coal Company
Jeffries Coal Company
Johnson Coal Company
The Roundup Coal Mining Company
Western Coal Company

WYOMING

Sheridan Wyoming Coal Company ..... (2)
Storm King Coal Company

UTAH

Peerless Sales Company
Uta-Carbon Coal Company

NEW MEXICO

St. Louis, Rocky Mountain & Pacific Co. ... (2)

ARKANSAS

Smokeless Coal Company

CANADA

Lethbridge Collieries, Limited ..... (2)
The Monarch Coal Mining Company, Limited
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Ltd. ..... (2)

MEXICO

American Smelting & Refining Company

* INDICATES NUMBER OF MINES USING THE NON-EXPLOSIVE MINING METHOD

CARDOX
HARDSOCG
DRILLING EQUIPMENT
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

• BELL BUILDING • CHICAGO 1, ILLINOIS •

TOURNADOZER

Cleans up for 3 Shovels.

Dozes overburden — Tournadozer's stability, multiple-disc air brakes, instant controls, and sure four-wheel traction enable it to work safely at edge of dump. Dozing cycle is completed in ⅓ of the time it takes slow-moving crawler.

Highly mobile Tournadozer cleans up around shovel at Genoa Mine. Because of its power and high-speed dozing cycles, Tournadozer was able to do clean-up work for as many as 3 shovels in E. W. Coons Company's pit.

At Eveleth, Minnesota, the E. W. Coons Company really put their rubber-tired Super C Tournadozer through its paces at their Genoa strip mine. Used primarily to maintain two overburden dumps and a lean ore stockpile, Tournadozer's high speed and extreme mobility enable it to handle all 3 dumps with time to spare . . . produce dollars while other units are in transit to the job.

Does 7 Jobs in 10 Hours

For example, the E. W. Coons Co. frequently call upon their high-speed Tournadozer to clean up spillage around their large stripping shovels . . . then hustle off and maintain to-and-from-dump haul roads. On a recent night shift their "fast-stepping" Tournadozer maintained both overburden dumps . . . the lean ore stockpile . . . did clean-up work around three stripping shovels . . . then sped out to do haul road maintenance work — all in one 10-hour shift of operation! No wonder E. W. Coons Co. like their Tournadozer.

Goes Anywhere—Fast

Like Coons, you will find that Tournadozer travels anywhere around the mine . . . negotiates steep

LeT

See your Le Tourneau Distributor NOW for complete information

...at Minnesota Iron Mine

...Maintains 3 Dumps

Instantaneous shift plus high speeds forward and reverse enable Tournadozer to move more dirt per hour. Fast rubber-tired speed and 100% mobility let it run anywhere, anytime . . . a mile across pit is only a few minutes away.

grades . . . can travel on pavement or cross-country. Giant rubber tires carry it across rails or along right-of-way. No matter where you want to go for dozing, clearing, hauling or pushing service there is no need for planking, no waiting for trailer or flatcar.

Plenty of Power and Traction

Four-wheel drive powered by 180 h.p. diesel engine gives you plenty of power and traction behind rugged 2½-yard blade for dozing under all conditions. Constant-mesh transmission with instantaneous speed selection means you have constant power without stopping to shift gears. Electric control means you get faster, easier operation . . . increased operator efficiency.

Ideal for All Dozing Jobs

Tournadozer meets the multiple demands of the E. W. Coons Company and will fill your need for a faster, more maneuverable dozer, too.

For complete facts on rubber-tired Tournadozer, contact your LeTourneau Distributor TODAY!

Tournadozer-Trademark Reg. U.S. Pat. Off.

LETOURNEAU PEORIA ILLINOIS — JOB-PROVED Over 6-45 Built and Shipped — **TOURNADOZERS**

IT'S RUBBER THAT PUTS THE ACTION IN TRACTION

Wherever Coal is Mined You Will Find "Cincinnati Mine"

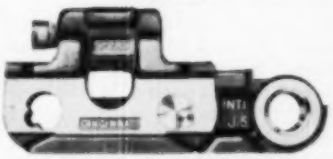
THE WORLD'S FINEST COAL CUTTING EQUIPMENT

In thousands of mines all over the World, Cincinnati Chains, Bits and Bars are helping Mine Operators reduce coal cutting costs. The wide acceptance of Cincinnati Coal Cutting Equipment over a period of years is proof of its top performance and dependability . . . proof of the soundness of the engineering and design built into Cincinnati Coal Cutting Equipment. If you have a particular cutting problem, let us hear from you. The chances are we can help you as we have helped hundreds of the world's largest producers. Feel free to call on us or any one of our representatives at any time.

CINCINNATI DUPLEX CHAIN

The Cincinnati Duplex Chain with the Duplex Bit is recommended for maximum cutting efficiency. The block and connector are drop forged of high grade alloy steel, carefully heat treated and scientifically engineered to withstand hard usage.

Made for exclusive use in Cincinnati Duplex Chains. A double ended, reversible, low cost long life bit that's heat treated to specific cutting requirements.



CINCINNATI STANDARD CHAIN

Similar in design to the DUPLEX . . . accomodates either standard mine sharpened bits or the popular Stanex Holder and Bit.

STANEX MOUNTING

Combination of strong durable holder and Stanex reversible Double Ended Bit to fit Cincinnati Standard Chain or other standard chains.

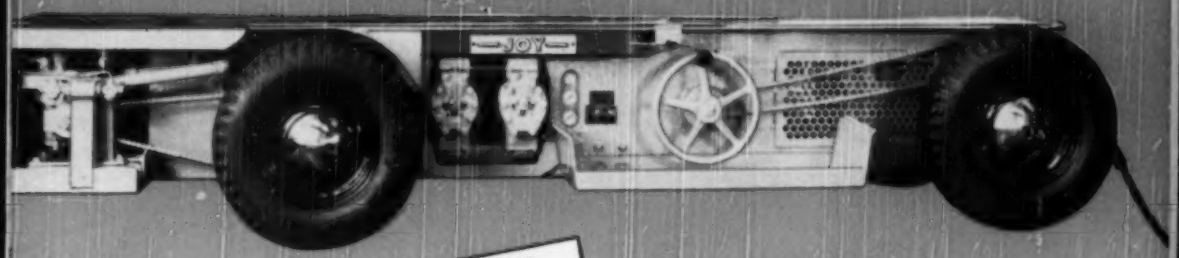
Alloy Steel heat-treated Rivet that holds bearing pin against longitudinal displacement. Easily removed.

Hardened Eccentric Pin is designed so it can't turn in block . . . placing joint Wear between pin and insert.

Replaceable long-life, hardened alloy steel Connector Insert that gives new factory joint accuracy to a worn connector.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO



TYPE WK-83 . . . TRACKLESS
SELF-PROPELLED—30" TO 34" HIGH

JOY MINE-AIR COMPRESSORS are available in rubber-tire and track models, either self-propelled or drawn-bar types, and in permissible units. Compressors are highly efficient, two-stage, single-acting, air-cooled—built in 150, 175, or 240 CFM sizes.

JOY

MINE-AIR COMPRESSORS AND DRILLS

DO YOUR ROOF-BOLTING JOB BEST and FASTEST!

JOY Roof-Bolting Equipment is not only field-proved . . . it's backed by 50 years of compressor and drill-building experience.

You can drill your holes in low coal with minimum steel changes

JOY STOPER DRILLS include a complete range of sizes down to 21" high. They do the entire roof bolting job: drill the hole, drive the bolt and wedge, and tighten the nut with an exclusive built-in torque wrench. In a 36" or thinner seam, JOY stopers can drill the maximum depth of roof hole with the minimum number of steel changes.

Write for Bulletins, or

Consult a Joy Engineer

WBD CL 2715

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

A sequence showing the JOY Continuous Miner completing a break-through: *Above*, getting ready for a sweep from floor to roof. *Below*, a moment later, the JCM beginning the cut. Note the safe position of the operator, 14 ft. back from the face.

Maximum Production

★ Greatest Safety

★ Lowest Cost per Ton

That's the PROVED Operating Record

of the JOY CONTINUOUS MINER

What can it do for You?

WRITE FOR BULLETIN, OR *Consult a Joy Engineer*

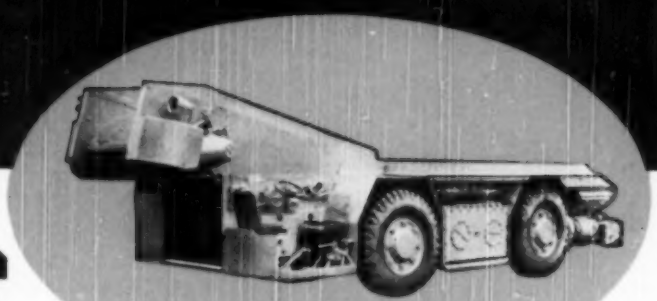
W&O CL 2010

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

The 10-SC, here being loaded by a JOY Continuous Miner, has the capacity, power and speed needed for real high-production work.



Complete hydraulic control, adjustable elevating discharge, and four-wheel drive and steering mean greater maneuverability, more flexibility.

JOY

10-SC SHUTTLE CAR

A *RUGGED, HEAVY-DUTY* MACHINE—

field-proved for fast, dependable, low-cost transfer in high-production mining!

Write for Bulletin, or

Consult a Joy Engineer

W&D CL 2920

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Bethlehem 745-S guard rail. All clips are held in place by thick, heavy rivets. The two inside clips are stationary. The four outside clips rotate; simply strike them with a hammer until they swing around over the base of the running rail. A good tight fit always results.

Bethlehem's New Detachable Guard Rail

for use with steel frog ties

You've never seen a guard rail that's as quickly and easily installed as this one. It's Bethlehem's new design 745-S, and attaching or removing it is mere child's play.

All you do is slide the base plates under the running rail until the riveted stationary clips fit snugly over the rail base; then tap the outside rotating clips into place with a hammer. There's your guard rail, sturdy and tight and shock-resisting. The method of installation is, in principle, the same as that used with Bethlehem steel mine ties.

Another big advantage: the need for chocks is eliminated. There are no holes to be drilled in the stock rail; no bolts to insert, no nuts to run up.

The 745-S is available in several different lengths and is made for use with any weight of rail from 30 lb to 60 lb inclusive. It's built to withstand heavy thrust and shock when used with steel frog ties as we recommend; and it's ideal for service with prefabricated track. For full details—or an actual demonstration—call the nearest Bethlehem man.

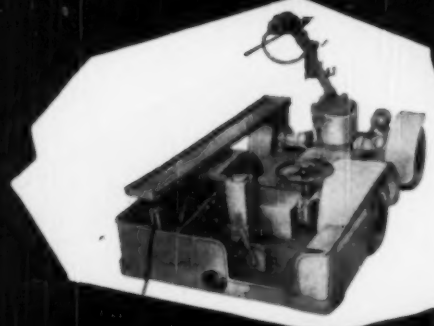
This partial track assembly shows two 745-S guard rails, two Bethlehem frog ties, and a Design 289 frog. Weight of rail, 30 lb. Note how the clip arrangement on the frog ties helps give added stiffness to the guard rail assembly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★



speed drilling

with CP Tramdrills and CP Drill Arms

These mine operators are getting out more coal . . . in less time . . . and at lower cost . . . by using CP Permissible Tramdrills and CP Drill Arms.

Average drilling time 12 minutes a place of nine $2\frac{3}{4}$" diameter, 8-foot holes; four holes near roof and five at an angle into bottom.

Average drilling speed of six feet a minute for $2\frac{3}{4}$" diameter holes in coal with considerable impurities.

In rooms ranging from 18 to 22 feet wide, seven 9-foot holes are drilled per place, the drilling time for a room averaging ten minutes.

CP Tramdrill, with two drill arms in operation, averages 14 minutes to drill a place of twelve 4" diameter, 8-foot holes.

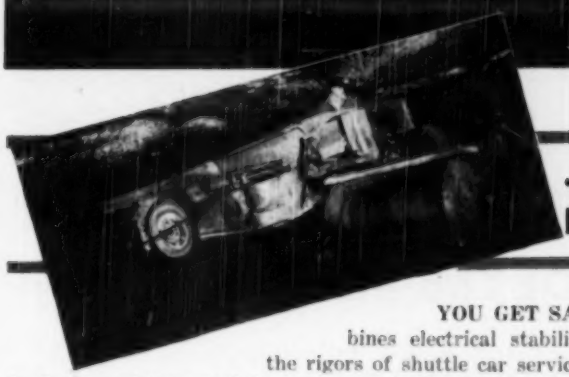
If you are interested in getting similar results, write for full information on electrically powered CP Tramdrills and Drill Arms.

CHICAGO PNEUMATIC TOOL COMPANY

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

SAFETY
DEPENDABILITY
ECONOMY

YOU GET ALL THREE
IN THE NEW——
SIMPLEX-TIREX
SHUTTLE CAR CABLE



... and all three add up to
BIGGER PROFITS for you.

YOU GET SAFETY. Insulation over the conductors combines electrical stability with mechanical toughness to withstand the rigors of shuttle car service... The jacket of Selenium Neoprene Armor is flame resistant and bears approval No. P-101 of the Department of Mines, Commonwealth of Pennsylvania.

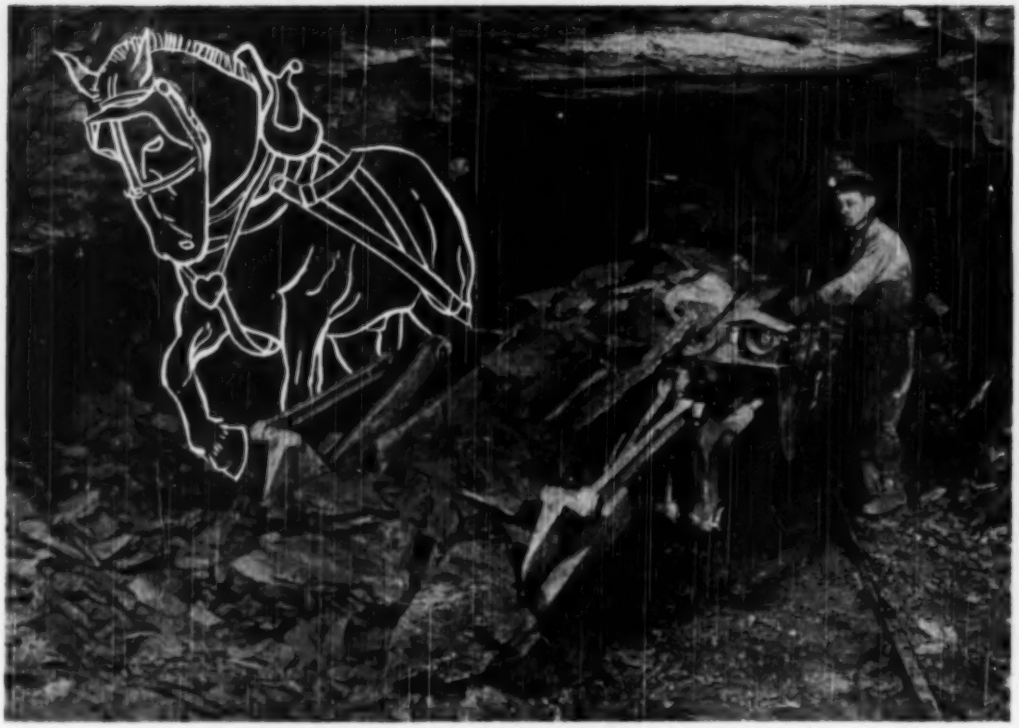
YOU GET DEPENDABILITY. New and exclusive GEAR-SHAPED insulated conductors firmly interlock with the jacket so that even continual twisting of the cable cannot pull them out of position. They will not twist, will not override each other... The Selenium Neoprene jacket is CURED-IN-LEAD for added toughness and will stand up under crushing and runovers and exposure to water, acids, grease, oil, and heat.

YOU GET ECONOMY. Safe, dependable operation assures long, trouble-free cable life—means low maintenance costs, infrequent replacements, less down time per machine ... Simplex-TIREX Shuttle Car Cables are small in diameter, light in weight; are quickly and easily installed. Their flat construction allows more cable per reel; increases the serviceability of each machine.

For complete information and specification data contact the Simplex representative in your area or write us direct for Folder 1007.

SIMPLEX-TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



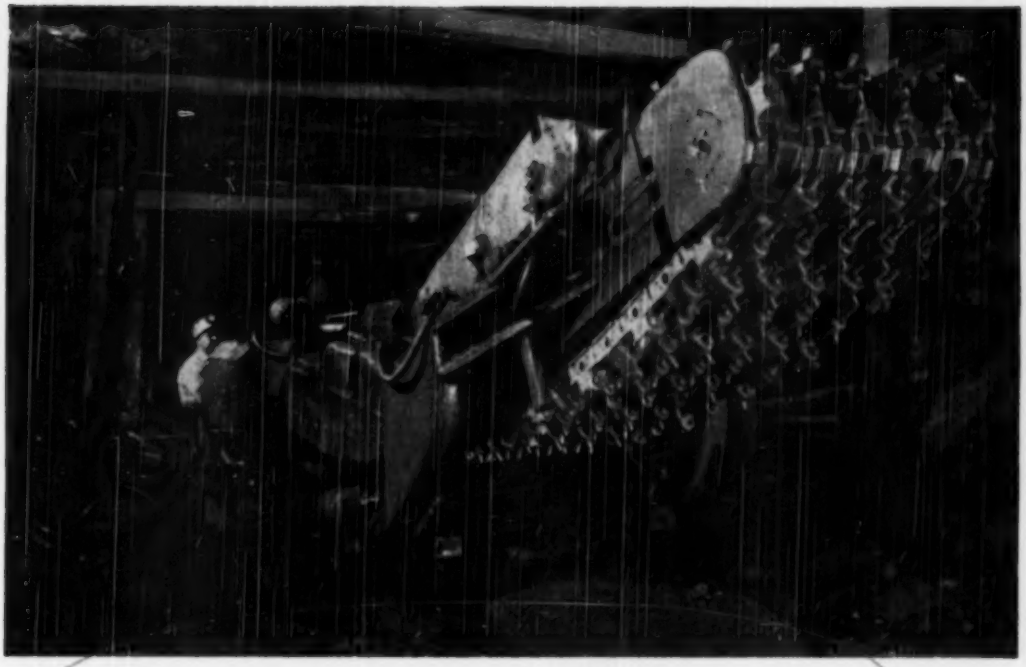
The WORKHORSE Of The Mining Industry!

Regardless of the material that must be moved out of your mine—be it coal, rock, or slate—count on the rugged Whaley "Automat" to load it quickly, effectively and, bear in mind, consistently.

As one prominent coal operator recently said, "Without these machines, cost of rock work would have made us close several of our mines." Operators are checking up on such service and putting the shovel-action "Automat" to work for tonnage loading . . . rapid entry development . . . for quick clean-up of falls . . . for reopening of old entries and air courses prior to pillar recovery . . . for making grades. All of these uses mean there's seldom an idle minute in the life of an "Automat!" It's this constant, efficient high-capacity loading day-in and day-out that has made the shovel-action "Automat" the "Workhorse of the mining industry!" Myers-Whaley Company, Knoxville, Tenn.

MYERS-WHALEY CO.

"MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS"



Two-way savings insured

in operation of new continuous mining machine

with Gulf Mining Machine Lubricant B

Outstanding performance in conventional cutting and loading machines operated by this progressive mine led to the selection of Gulf Mining Machine Lubricant B for their new Joy continuous miner.

They know from experience with other equipment that Gulf Mining Machine Lubricant B provides better protection for bearings and gears—that it eliminates such problems as lubricant throw-off and channeling, seals out coal dust, resists the washing action of water, and reduces wear. With Gulf Mining Machine Lubricant B in this new equipment, they have insured the best possible lubrication.

As in most types of cutting and loading machines, this quality lubricant plus a hydraulic oil take care of the entire lubricating job in the continuous miner. Because several other types and grades are eliminated, lubricant storage and handling are greatly simplified and application errors at the face are avoided.

Fully approved by leading manufacturers, Gulf Mining Machine Lubricant B is the ideal lubricant for all types of mining machines. Investigate the two-way savings possible through its use. Write, wire, or phone your nearest Gulf office and ask a Gulf Lubrication Engineer to call.

Gulf Oil Corporation · Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

Offices in Principal Cities in 30 States

GULF INDUSTRIAL LUBRICATION

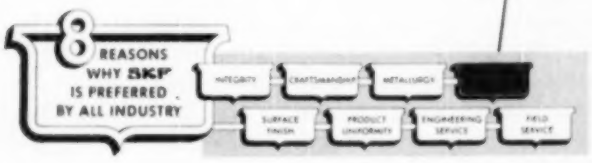
NEVER TOO MUCH... NEVER TOO LITTLE
BUT **ALWAYS** JUST RIGHT

because of
TOLERANCE CONTROL

Another reason why industry prefers SKF

Remember leapfrog? How you used to have to skim over just right? Well, it's very much the same thing in specifying bearings. You don't want tolerances too great... and you don't want tolerances closer than the job demands. But you want to be sure that tolerances are *right*... are *always* properly controlled... *always* meet established standards. SKF adheres rigidly to these standards. Ceaseless vigilance in every stage of production assures complete control of tolerance throughout the entire manufacturing cycle. You can always be sure that any SKF Bearing will exactly meet your requirements... and will meet them again and again. Never forget, either, that *tolerance control* is only *one* reason why SKF Bearings will help you build equipment which, through smooth, economical performance, helps develop greater acceptance for your product. **SKF** INDUSTRIES, INC., PHILADELPHIA 32, PA.

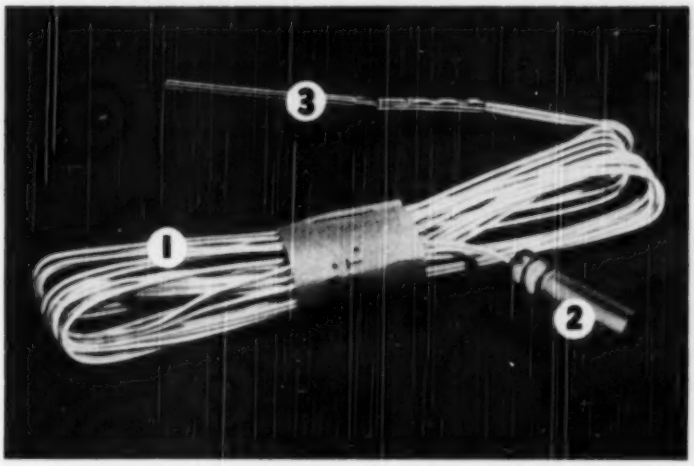
SKF
Ball and Roller Bearings



Inventors and Pioneers of the Self-Aligning Ball Bearing and Spherical Roller Bearing

7050

WHY COAL MINERS O.K. THESE CAPS



Du Pont Electric Blasting Caps are well known for their dependability. Three important reasons are that they embody the most advanced improvements in design and manufacture that have been made in over fifty years. For example:

1 NYLON INSULATED WIRES. They're tough. They resist abrasion, and yet the insulation can readily be removed when necessary. They're clean . . . easy to handle . . . nonkinking. And they're colored for maximum visibility in the mine.

2 RUBBER PLUG CLOSURES. Double crimping securely locks rubber plugs in cap shells and assures maximum resistance against water, dampness and the extremes of temperature. In addition, these closures permit the use of short length cap shells that make priming easier and safer.

3 SHIELDED SHUNTS. Cellophane-lined aluminum foil short-circuits the leg wires through the entire length of the bared ends and also shields the ends from contact with electric currents. This gives double protection against premature firing.

Du Pont Electric Blasting Caps are supplied with white insulated iron or red and yellow insulated copper wires. Both types are available in standard lengths ranging from four to twelve feet.

The Du Pont representative serving your vicinity will gladly give you complete information about these caps or any of the other Du Pont products designed to help make the job of mining coal easier, safer and more economical. Have a friendly talk with him whenever you can. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Del.

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

These Du Pont Permissibles also widely approved

"MONOBEL" AA because it is an economical producer of big lump coal.

"LUMP COAL" C because it has a characteristic heaving action that puts coal where it's easy to load.

"GELOBEL" C because it is ideal for hard rock and slate work . . . a gelatinous dynamite unaffected by wet conditions.

—and for stripping:

DU PONT "NITRAMON"* —the safest blasting agent—is steadily becoming more popular. Easy and safe to store, handle, load, hook up and fire. Packed in watertight containers. Non-headache-producing.

DU PONT MULTIPLE-SHOT PERMISSIBLE BLASTING MACHINE

Compact. Sturdy. Water-Resistant. A ten-cap unit of the twist type.

DU PONT "DETECT-A-METER"

New instrument is both a stray current detector and a blasting galvanometer. An inexpensive investment in greater safety.

GOT YOUR COPY?

New Edition—Du Pont Blasters' Handbook

Contains over 470 pages of helpful information for every blaster. Profusely illustrated. It's a book you need and can use. Send for it now. $1.50 postpaid, including tax where applicable.

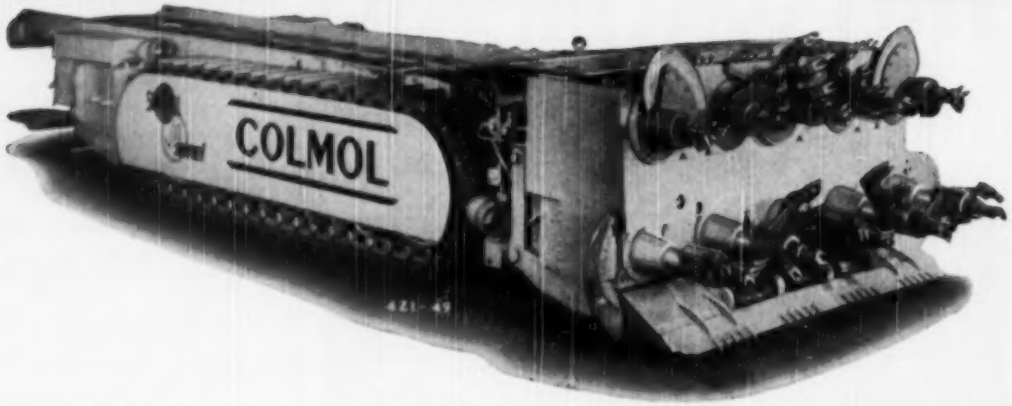
*Reg. Trade-mark for nitroamonitrate blasting agent

Listen to "Cavalcade of America" Tuesday Evenings—NBC

DU PONT

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

TO PRODUCE—FAR AHEAD OF SCHEDULE



(Patent Pending)

COLMOL

is engineered, manufactured, sold and serviced

by

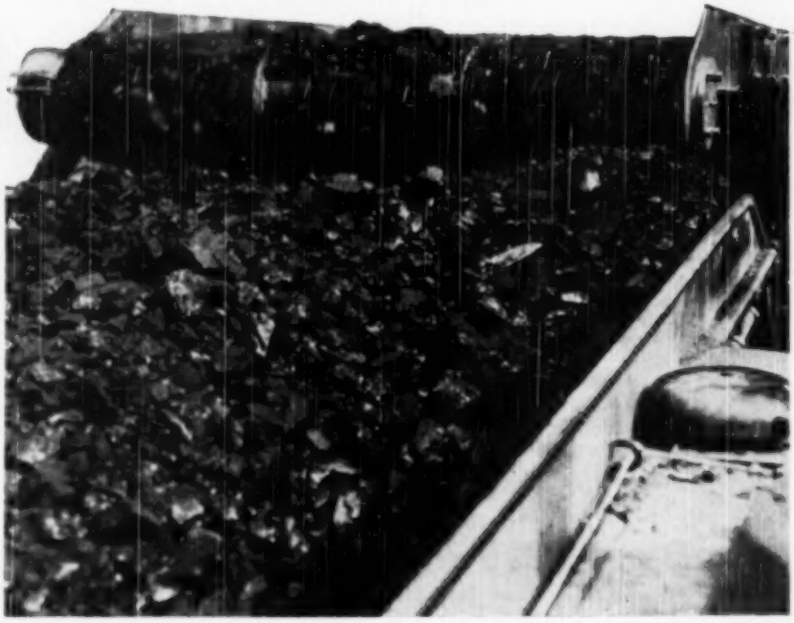
The large scale production rate of the COLMOL—3 to 5 tons per minute—means a great change in coal cutting and loading methods in the mining field. Records are being made daily—this one-process device has a bright future. In production are models to accommodate seams of varying thickness from 30" and up. Let us tell you more about the COLMOL principle of continuous mining.

THE JEFFREY MANUFACTURING COMPANY

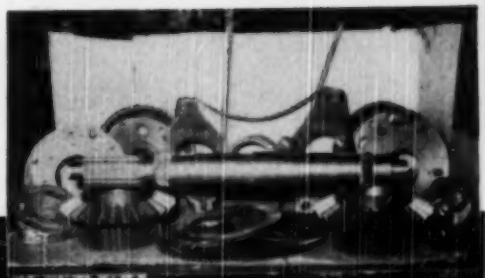
912 NORTH FOURTH STREET, COLUMBUS 16, OHIO

High production is just one of the many features of the COLMOL—others (see below) will be taken up in subsequent pages.

- Production (first of a series)
- Safety
- Ruggedness
- Economy of operation
- Maneuverability
- Timbering
- Clean-Up
- Continuity of operation
- Adaptability
- Enlarged applications



LESS
clutch maintenance



MORE
loader output . . .

Superla
Mine Lubricants

CLUTCH REPAIRS costs down 50% . . . no delays for "warming up" loaders . . . easier and faster loading . . . these benefits have been brought to midwest mines by SUPERLA Mine Lubricants. Here's why these products will assure similar benefits for you.

SUPERLA Mine Lubricants keep transmission cases clean. Clutches operate easily with no gumming or coking caused by oil deposits. When machines are started, these lubricants flow readily between clutch plates, protect them against wear, eliminate "clutch drag" and the necessity for warming up loaders. During long periods of continuous operation, SUPERLA Mine Lubricants do not thin out excessively, provide safer lubrication for clutch plates.

A test of SUPERLA Mine Lubricants will prove their ability to keep your loaders on the job longer with less maintenance. These products are available in oil and grease grades suitable for any type of cutter or loader. A Standard Oil Lubrication Engineer will gladly help you select the proper grades for your equipment.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

The ROCKMASTER "16" Blasting System Cuts The Cost Of Handling Rock!

The story could be summed up in two words: *improved fragmentation.* Or you might prefer *better breakage.* However, the details of the ROCKMASTER "16" story make interesting reading for blasters.

This better breakage has increased loading machine and shovel production as much as 40% in mines, pits, quarries, and construction jobs. Many operators have cut secondary shooting in half . . . others have eliminated it. Time once wasted in uncovering and setting aside big rocks now goes into productive work. There's a sequel to this story! Better breakage means lower costs in milling—less work for the crusher and less wear and tear on equipment.

Better breakage is just one of the many advantages of the new ROCKMASTER "16" Blasting System. It helps you produce more material per pound of explosive . . . gives you more footage per round. Sixteen periods—a wide choice of short or long milli-second delays—add up to better control over throw, backbreak, and material size . . . better control over noise and vibration. Sixteen delay periods fire in 550 milli-seconds! There is less strain on timbers and roof . . . less dust and a quicker return to the face.

From the face and the front office you hear: "ROCKMASTER "16" *is the greatest improvement in blasting methods since Atlas introduced milli-second blasting.*" Write for new booklet showing you how ROCKMASTER "16" fits into your operation.

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

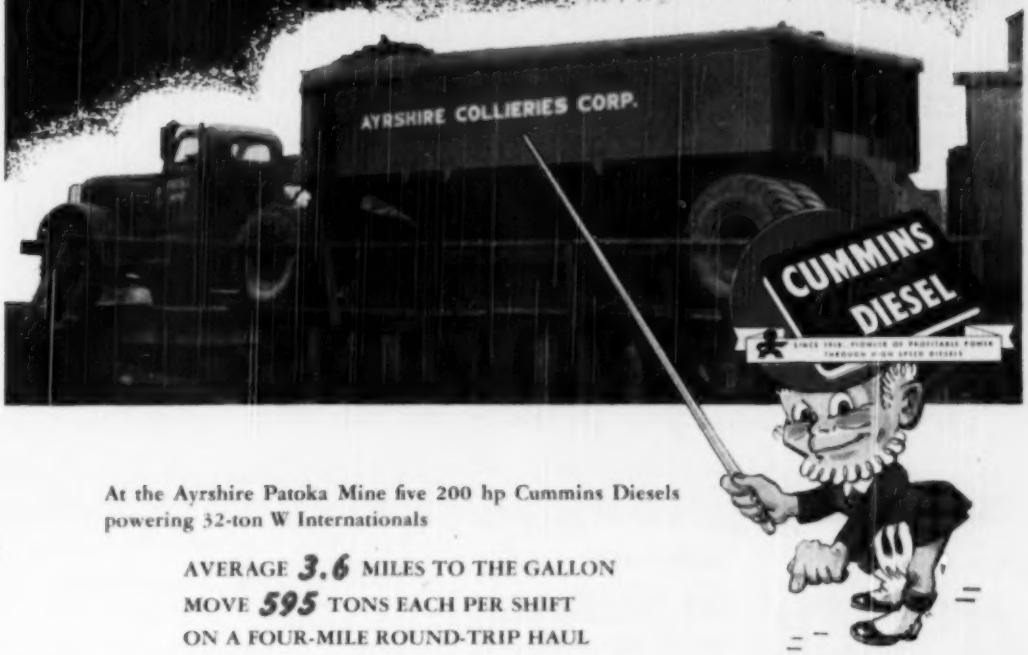
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

AYRSHIRE COLLIERIES

Cuts Haulage Costs Reduces Inventories

By Standardizing on CUMMINS



At the Ayrshire Patoka Mine five 200 hp Cummins Diesels powering 32-ton W Internationals

AVERAGE **3.6** MILES TO THE GALLON
MOVE **595** TONS EACH PER SHIFT
ON A FOUR-MILE ROUND-TRIP HAUL

And in the first seven months of operation *not one cent was spent on engine maintenance.*

At six Ayrshire Collieries Corporation Indiana-Illinois strip mines **55** coal haulers are powered with Cummins *Dependable* Diesels. Cummins Power is used exclusively because Ayrshire engineers are convinced that Cummins Diesels move more coal for less cost.

Cost Conscious?
CHOOSE CUMMINS DIESELS

SERVICE—One of the more than 200 Cummins Dealers is as close as your phone!

HIGHSPEED DIESEL ENGINES (50-550 HP) FOR ON-HIGHWAY TRUCKS • OFF-HIGHWAY TRUCKS • BUSES • TRACTORS • EARTH-MOVERS • SHOVELS • CRANES • INDUSTRIAL LOCOMOTIVES • AIR COMPRESSORS • LOGGING YARDERS AND LOADERS • DRILLING RIGS • CENTRIFUGAL PUMPS • GENERATOR SETS AND POWER UNITS • WORK BOATS AND PLEASURE CRAFT.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

EXPORT: CUMMINS DIESEL EXPORT CORPORATION • COLUMBUS, INDIANA, U. S. A. • CABLE: CUMDIEX

"Job-Rated"... yet priced with the lowest

...and look what you get for what you pay...

1. "PILOT-HOUSE" CABS:

Rear quarter windows and the big 890 sq. in. windshield give safe all-'round vision. Vent wings . . . plus the deep-cushioned comfort of 57¼-inch Air-O-Ride adjustable seats.

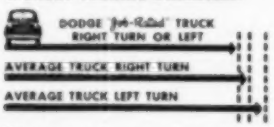
2. AN ECONOMICAL TRUCK ENGINE:

An engine designed and "Job-Rated" to develop power for 1½-ton truck loads . . . NOT the same engine used in lighter trucks. A Dodge truck engine is "Job-Rated."

3. NEW SYNCHRO-SHIFT TRANSMISSIONS:

New Dodge "H" models (1½-ton) are equipped with "Job-Rated" 4-speed silent helical gear transmissions. New 5-speed Synchro-shift transmissions available.

4. SHORT TURNING DIAMETERS:



Wide tread front axles, cross-type steering and short wheelbases provide shorter turning diameters for easy handling and parking.

5. BIGGER LOAD SPACE:

Dodge trucks, engineered for balanced weight distribution, provide for maximum body length in relation to wheelbase. For example: 152" wheelbase model is "Job-Rated" for 10-foot to 13-foot bodies.

PLUS

many more quality features that you'll want in your next new truck!

The truck illustrated . . . a Model "H" 1½-ton . . . fits its job. It's *"Job-Rated."*

It has *"Job-Rated"* power . . . a *"Job-Rated"* frame, transmission, clutch, axle, springs, brakes and tires.

The cost of operating this truck will be low. Upkeep cost will be low. This truck will last longer.

Does such a truck cost more? Emphatically "NO." Dodge *"Job-Rated"* trucks, ½-ton to 4-ton, are priced with the lowest in each weight class.

Ask your Dodge dealer to recommend the right *"Job-Rated"* truck for *your* job.

★ ★ ★

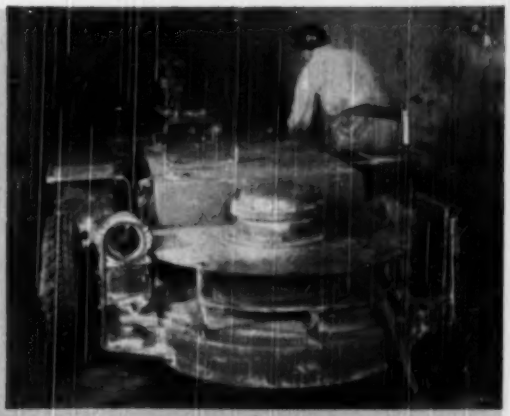
Dodge Model H-152 (illustrated) is one of 92 *"Job-Rated"* 1½-ton basic chassis models, ranging from 7,000 to 16,250 lbs. G.V.W. Seven wheelbases, conventional and C.O.E. Single-speed or two-speed axles.

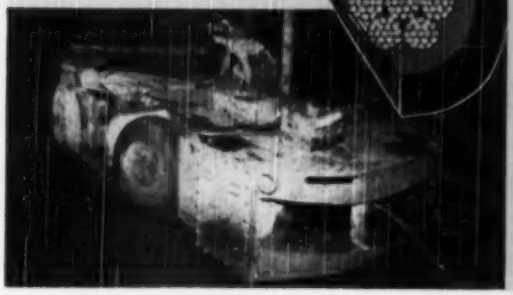
For low-cost transportation...switch to

DODGE "Job-Rated" TRUCKS

More than 250 different G.V.W. chassis models—½-ton to 4-ton

How much does cable failure cost you in "DOWN TIME"?





Photos—Courtesy Joy Manufacturing Co., Pittsburgh, Pa.

Simple arithmetic will give you the answer. For instance, a single typical mobile unit represents an investment of some $60,000. With a capacity of approximately 400 tons per shift, even a 10 minute "down time" of such a unit at the *wrong* time can be very costly. Insure yourself against this lost production with Rome 60 Mining Cables.

With Rome 60 on the job you are sure of top performance . . . plus, strict compliance with Federal and State of Pennsylvania safety requirements. Rome 60 Mining Cables are designed for hard usage and made to give long service life. In the shuttle car cable illustrated above note how the grounding conductor is webbed with Neoprene . . . as a matter of fact, solidly embedded in molded Neoprene . . . providing added separation between it and the power conductors. This feature minimizes "shorts," provides maximum flexibility, greater impact resistance and additional safety factor.

ROME 60 MINING CABLES ARE:

- Insulated with heat-resistant rubber for continuous 75° C. operation with greater overload protection.
- Sheathed with Neoprene, *molded in lead*, for high resistance to moisture, flame and abrasion.

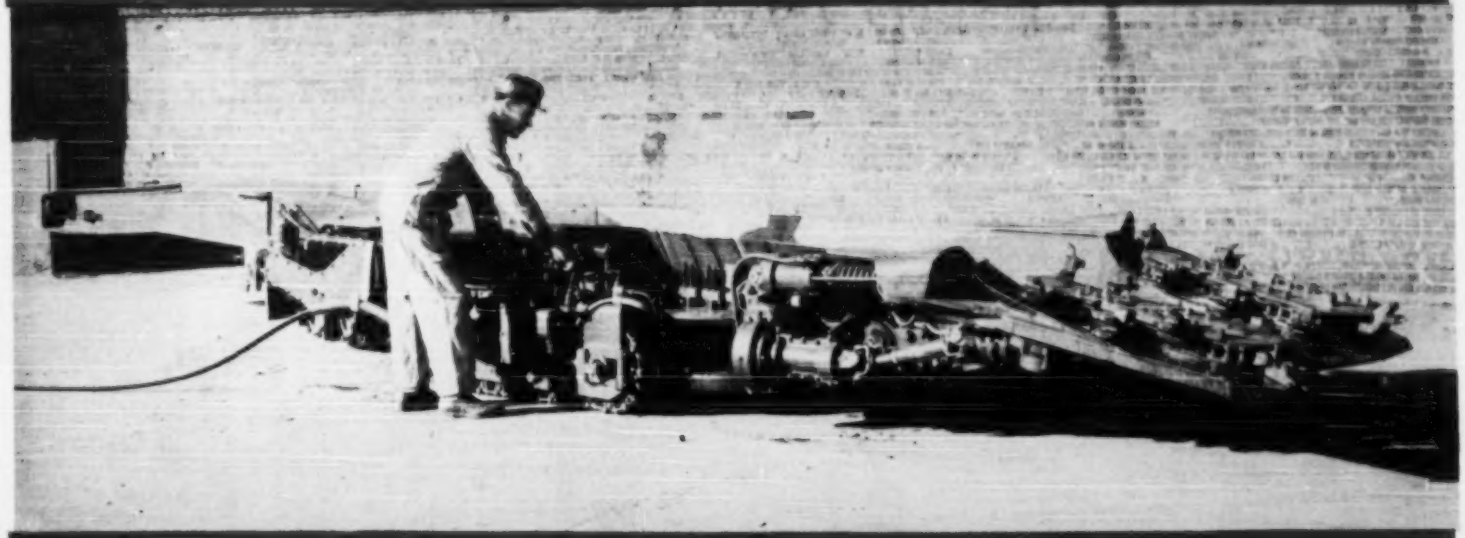
Make sure that your next mine cable is Rome 60.

It Costs Less to Buy the Best . . . Buy Rome 60

ROME CABLE
Corporation
ROME • NEW YORK

ROME CABLE ROME, N.Y.

THE GOODMAN
TYPE *660* TRACTOR TREAD LOADER



Rear conveyor can be swung through a horizontal range of 60 degrees. Can also be adjusted vertically.

It's a low machine with an overall height of 31 inches.

In 40 degree curve of any loading road or other size pseudo 12 foot clearance width. Only forward and backward maneuvering of the machine required.

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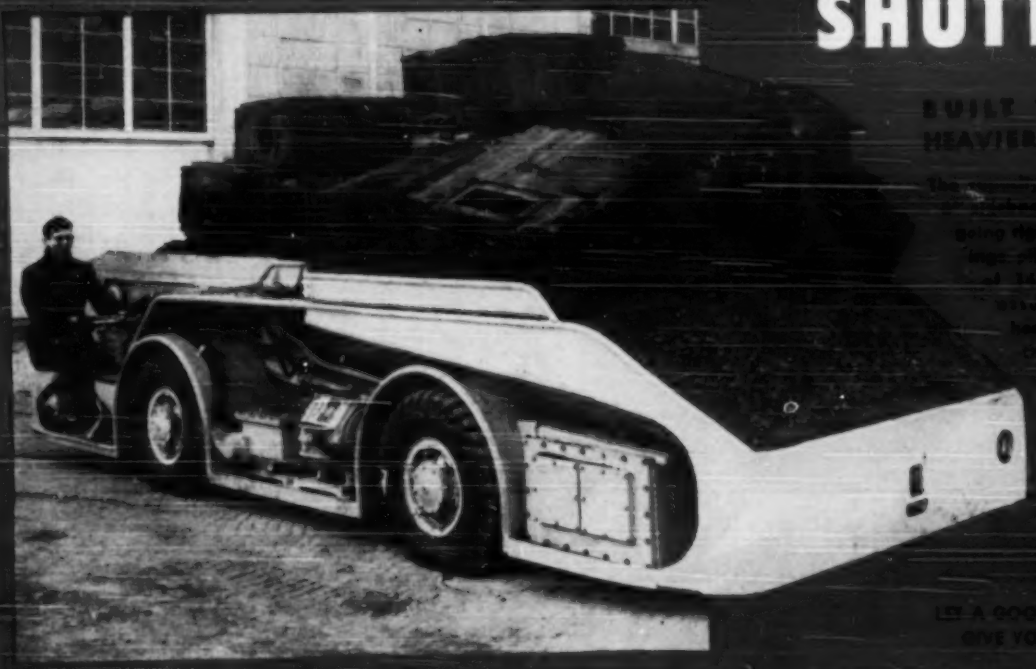

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JANUARY, 1950

IVAN A. GIVEN, EDITOR

Too High a Price?

CAN THE COAL-MINING INDUSTRY—operators, miners and investors together—continue to afford John L. Lewis? In fact, the question might be broadened to ask if the country as a whole can afford Mr. Lewis. In other words, are the benefits to employer, employee and the public resulting from organization being converted into losses by arbitrary and excessive use of the power such organization now gives to union officialdom? If that is not already the fact in coal mining, it could be fairly soon unless Mr. Lewis has a change of heart or his power is reduced.

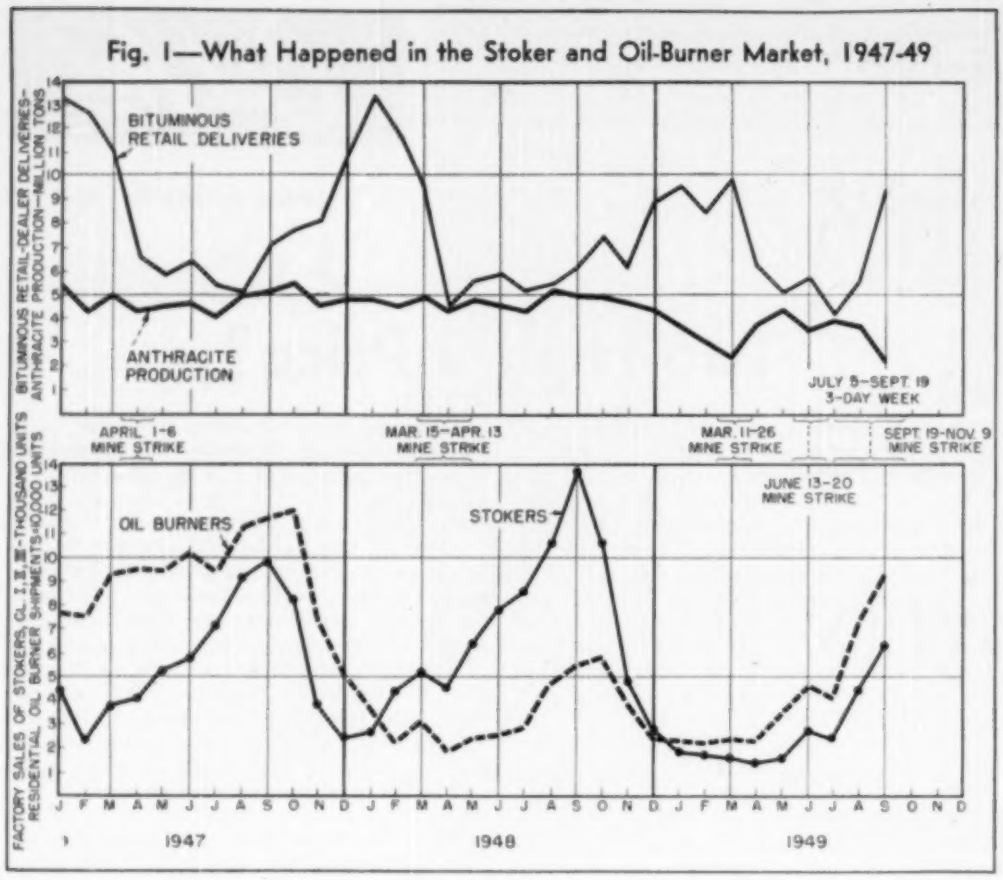
Part of the evidence supporting this conclusion lies in the wage loss suffered by the miners in 1949. Another and larger part, with broad implications for the future for both miner and operator, lies in the changed competitive situation outlined in the study beginning on the next page of this issue. In 1949, the relation between production stoppages and increased consumption of competitive fuels became much clearer—in fact, almost glaringly so. As a result of these and other work stoppages in the past, and the cost increases that have followed them, industrial and utility users in particular have turned more and more to multi-fuel boilers. Last year, therefore, when the miners were called out, a large majority of such users merely put padlocks on their coal stocks and started burning oil and gas. Among other results, this presented Mr. Lewis with a problem he apparently did not expect and accounts in part for the fact that he has had much rougher sledding in the past few months. In short, stockpiles were not reduced at the rate characterizing previous years, thus shifting the burden of holding out onto the miner rather than onto fuel users and the public.

But since multi-fuel equipment is not universal and since, as in pig-iron production, coal is the only fuel that can be used, stocks nevertheless were affected, though at a lower rate. And, at the time of this writing, they were being reduced still more by the reinstatement of the three-day week. Consequently, rebuilding will be necessary in the future, thus recouping in part the 1949 losses in tonnage and wages. But to the extent that oil and gas were used in place of the coal that would have been burned—either last year or in the future—wages and business were permanently lost. In fact, whether the individual miner is aware of it or not, he can give thanks with the operator that the high level of business activity expected for at least the next several months will prevent his losses from being even more severe. He still has the future to think about, however, and in that he has to catch up with the operator.

As for that future, there is no dodging the fact that for the next few years oil and natural gas are going to offer stiffer and stiffer competition—supplywise, pricewise and conveniencewise. And, as a result of Lewis piling new and lengthier stoppages and slowdowns onto all the others that have occurred in the past, the number of fuel users determined to put themselves in a position where they will not be at his mercy reached a new high at the end of 1949. But while the picture is grim, it still is by no means hopeless. Reports from purchasing agents quoted in the following article indicate that there still is a wide preference for coal and that if it eventually loses out a major reason will be uncertainty as to supplies.

Since Lewis is directly responsible for the supply uncertainty, as well as for the further burden of cost increases, the questions posed at the start of this editorial become entirely pertinent. There is every reason, therefore, why the operators—and the miners—and the public—should intensify their efforts to limit the power he now exercises to insure a healthy industry and a healthy fuel picture in the future.

Fig. 1—What Happened in the Stoker and Oil-Burner Market, 1947-49


BITUMINOUS RETAIL-DEALER DELIVERIES-ANTHRACITE PRODUCTION—MILLION TONS
BITUMINOUS RETAIL DELIVERIES
ANTHRACITE PRODUCTION
JULY 5-SEPT 19 3-DAY WEEK
APRIL 1-6 MINE STRIKE
MAR. 15-APR. 13 MINE STRIKE
MAR. 11-26 MINE STRIKE
SEPT 19-NOV. 9 MINE STRIKE
JUNE 13-20 MINE STRIKE
FACTORY SALES OF STOKERS, CL. I, II, III-THOUSAND UNITS RESIDENTIAL OIL BURNER SHIPMENTS-10,000 UNITS
OIL BURNERS
STOKERS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1947
1948
1949

What's Ahead for Coal

- **What 1949 Did to Markets**
- **How Competing Fuels Grew**
- **Why Coal Lost Ground**
- **Lessons Learned in 1949**
- **The Future—What Coal Can Do**

BY ALL THE SIGNS, 1949 was to have been a good year for coal—maybe not so good as 1948, but still good by most standards. It had all the symptoms of prosperity and stability. Business and industrial plants stayed active. National income held to high levels. Railway traffic was down slightly, but electric-power output moved higher. To repeat, the year should have been a good one for coal.

But there was Mr. Lewis. He called his miners out for two weeks in March, a week in June, and for over seven weeks from September into November. From July 5 to Sept. 19 and following Dec. 5, he put his miners on a three-day week.

Thus, though demand for fuel held strong, bituminous output was only slightly above the 1935-39 average of 400,078,000 tons, while anthracite dropped below the 1935-39 average. Meanwhile, other fuels moved into the energy-need gap and picked up strength in their attack on coal's markets.

How much damage was done to coal's markets? How many customers, having switched to other fuels, can be persuaded to return to coal? What can coal do—long-term and short-range—to win customers back and secure its markets?

In the following pages, what happened to coal's markets in 1949 is reviewed, the causes are studied

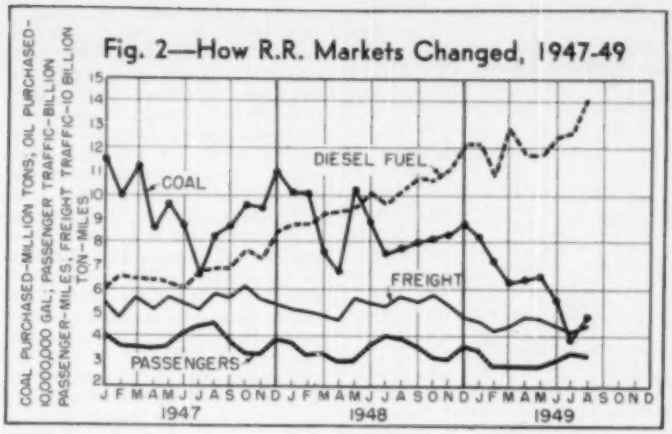


Fig. 2—How R.R. Markets Changed, 1947-49
COAL PURCHASED—MILLION TONS; OIL PURCHASED—10,000,000 GAL; PASSENGER TRAFFIC—BILLION PASSENGER-MILES; FREIGHT TRAFFIC—10 BILLION TON-MILES
COAL
DIESEL FUEL
FREIGHT
PASSENGERS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1947
1948
1949

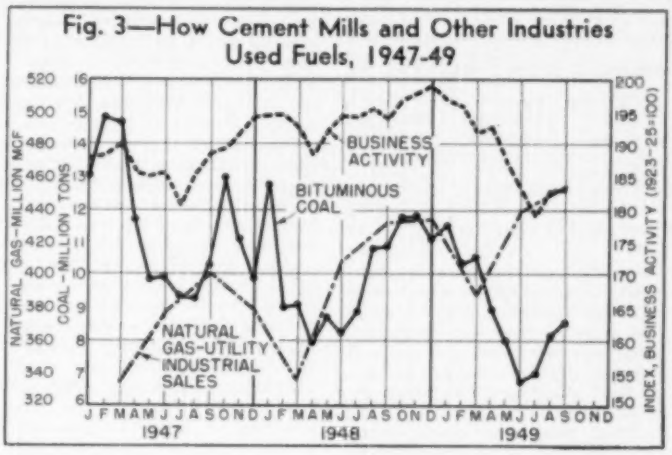


Fig. 3—How Cement Mills and Other Industries Used Fuels, 1947-49
NATURAL GAS—MILLION MCF
COAL—MILLION TONS
INDEX, BUSINESS ACTIVITY (1923-25=100)
BUSINESS ACTIVITY
BITUMINOUS COAL
NATURAL GAS-UTILITY INDUSTRIAL SALES
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1947
1948
1949

and a course of action is outlined. For those who join the battle to restore coal's markets and its prestige, the rewards will be bountiful.

Home Heating

Strikes Hit Coal Hard

Stoker Sales at Low Level

Oil Burners Gain Strength

Natural Gas Moves In

In the home-fuel market, coal has been hit hard. The midwinter peak for retail-dealer deliveries of bituminous usually comes in January (Fig. 1). In January, 1947, retail-dealer deliveries totaled 12,945,000 tons; January, 1948, the winter of critical oil and gas shortages, up only 2.4% to 13,254,000 tons; in January, 1949, down 28.5% from 1948 to 9,477,000 tons. In the mid-summer valleys, retail-dealer deliveries totaled 10,376,000 tons in the two-months period July-August, 1947; 10,666,000 tons in 1948 and only 9,628,000 tons in 1949. In short, the seasonal peak-and-valley cycle reached a three-year low in 1949.

PRICES—Price boosts have played some part in coal's decline. Table I, for instance, shows how fuel prices changed in New York City between 1941 and 1949. While these changes in coal and oil were taking place, average price of natural gas throughout the country declined 10% from 72c per Mcf in 1941 to about 65c in 1948, when the million-Btu cost was about 60.4c.

Thus, though automatic solid fuels—anthracite rice and bituminous stoker coal—have held onto their price advantage, retail sales have moved more down than up since 1941. Part of this movement came about because, with increased income, more people were willing to pay premium prices for luxury fuels. But there is no doubt also that uncertain coal supplies played a strong hand in the movement. Many of those who changed to oil or gas switched not because they could not get coal but because they feared a shortage.

DELIVERIES—Go back to April, 1947, the month of a week-long strike. Retail-dealer deliveries of bituminous dropped to 6,494,000 tons from 10,989,000 tons in March. Later, in March and April, 1948, when the miners were idle for four weeks, retail-dealer deliveries for the two months added up to 13,939,000 tons, down 20.2% from the same two months in 1947.

With a two-weeks shutdown in March, 1949, total retail-dealer deliveries in March and April fell to 15,915,000 tons, down 8.9% from the same two months in 1948. In the four-months period June-September, 1949, during the three-day week and the start of the no-day week, retail-dealer deliveries totaled 24,590,000 tons, slightly above the total for 1947 and 1948 but marked by a low point in July of 4,042,000 tons, 24% below July, 1947, and 21.8% below July, 1948—low enough to scare lots of customers over to oil or gas.

As for anthracite, which responds quickly to home demands, total production up to Oct. 30, 1949, was 26.9% below the corresponding period in 1948. In October, 1947, the peak month for anthracite shipments, production totaled 5,510,000 tons; in October, 1948, 4,960,000 tons; in October, 1949, 4,930,000 tons. Comparing October, 1948, with October, 1949, the loss was negligible. However, where the end-of-summer upturn in 1947 began in August and continued higher month by month through October, in 1948 production fell off slightly in September and October, and in 1949, after dropping a little in August, fell off sharply in September, and in October failed to match the mark made a year earlier.

STOKERS—Along with coal's losses in the home-fuel market, home-size stoker sales also have followed a downward trend. In 1947, the recovery from the February slump in monthly factory sales of stokers was steady, with sales reaching a peak of 9,862 units in September, 382% above February. Monthly oil-burner shipments meanwhile rose 55.7% from 77,038 units in February to 119,935 in October.

The next year, 1948, was even

Strikes and Shortened Week Speed Changeovers to Oil and Gas

Fig. 4—How Electric Utilities Burned Fuels, 1947-49

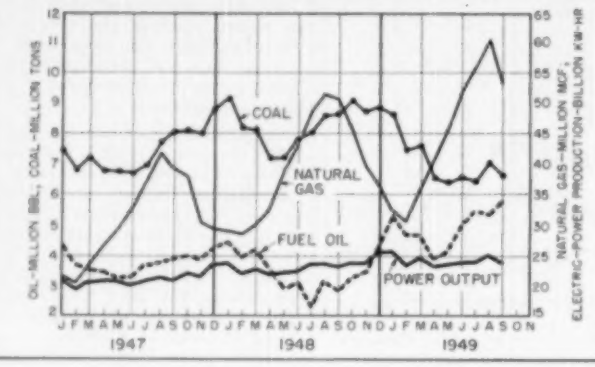

OIL—MILLION BBL.; COAL—MILLION TONS
NATURAL GAS—MILLION MCF.; ELECTRIC—POWER PRODUCTION—BILLION KW-HR
COAL
NATURAL GAS
FUEL OIL
POWER OUTPUT
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N
1947
1948
1949

Table I—How Fuel Prices Changed in New York, 1941-49

	Anthracite Nut (per ton)	Anthracite Rice (per ton)	Bituminous Stoker (per ton)	No. 2 Fuel Oil (per gal)
Price, Nov., 1949.....	$20.92	$12.62	$14.59	11.9c
Price per million Btu.	80.5c	48.5c	52.1c	85.9c
Increase since Dec., 1941...	69.4%	64.1%	70.4%	63.0%

better for stokers. Homeowners, remembering the crucial oil shortage of the 1947-48 winter and fearing another in 1948-49, sent stoker sales up sharply to a new September high of 13,755 units, 39.4% above the 1947 peak. April, when the four weeks shutdown reminded home users that they could not depend on regular supplies of coal, was the only low month up to the peak in September, 1948.

OIL BURNERS—In 1948, oil-burner sales reached their peak in October, with shipments of 56,969 units, 52.6% below the same month in 1947. Fear of an oil shortage, as pointed out, was the big factor in slow oil-burner sales, as is shown by the fact that coal prices increased generally more than oil. In New York City, for instance, bituminous rose 12.5% between December, 1947, and December, 1948, while oil prices increased only 8%.

In 1949, repeated mine stoppages and slowdowns are reflected clearly in factory sales of stokers. Instead of moving sharply upward after the annual February low mark of 1,820 units, stoker sales continued to fall slowly through May to 1,552 units, down 14.7% from February, and then, turning slowly upward, fell far short of the usual September peak—down 53.5% to 6,389 units as compared with September, 1948. Oil-burner shipments, meanwhile, after holding steady to higher from December, 1948, through April, 1949, turned up sharply in May and reached 71,116 units in August, 210% above the preceding February and up 24.9% above October, 1948.

Thus, threats of coal shortages, together with higher prices for coal and high costs for stoker installations, have given oil burners the upper hand. As one big Chicago builder said last August, neither home owners nor home builders will put themselves at the mercy of Mr. Lewis.

NATURAL GAS—Natural gas also is moving into the home-fuel market with big strides. In fact, it is displacing fuel oil in some homes, as well as in factories, gas plants and electric utilities, and thus is releasing even more fuel oil for competition with coal. To be specific, residential customers of natural-gas utilities numbered 11,292,700 on June 30, 1949, an increase of 7.5% over June 30, 1948. Total residential sales over the 12 months ended June 30, 1949—878,621,000 Mcf—were 7.3% higher than in the preceding 12-months period, and revenues from residential sales were up 8.9% to $555,166,200, much of which a decade or so ago would have gone into the pockets of the coal industry and its people.

In that same period, the 12 months ended June 30, 1949, commercial customers of natural gas, including apartment houses, hotels, office buildings, stores and other non-industrial enterprises, increased 28.6% to 978,700; sales, 20.6% to 293,253,200 Mcf.; and revenues, 23.4% to $138,595,000.

Another yardstick for measuring the progress of natural gas is pipeline mileage. In the United States as a whole, utility natural-gas mains, including field, gathering, transmission and distribution lines but excluding service pipe, expanded from 212,670 mi in 1944 to 259,400 in 1948, an increase of 21.9%. In the Middle Atlantic region, the increase was 13% to a total of 32,100 mi; East North Central, 20.8% to 52,420 mi; South Atlantic, 16.3% to 21,300 mi; East South Central, 55.7% to 14,090 mi; West North Central, 30.3% to 32,370 mi; Rocky Mountain, 36.4% to 15,040 mi.

The end of the gas industry's plans is not yet in sight. Its construction program calls for 17,700 mi of new pipeline within the next few years. In October, 1949, *Oil and Gas Journal* listed 53 "principal natural-gas pipeline systems" which, at the end of 1950, will have a total of 100,428 mi of line in service and, by the end of 1949, would be delivering a daily capacity of 19,456,500 Mcf—equal to 804,451 tons of 13,000-Btu coal. Most of these big lines reach north and east from southwestern fields.

Growth on this scale gives substance to a recent statement by *Oil and Gas Journal:* "High-priced coal now makes natural gas competitive not only in present markets but also in areas where it has not been available." That is why natural gas soon will move into New England. For example, Texas Eastern Transmission Co. recently amended its application before the Federal Power Commission to increase its already-authorized capacity to 200,000 Mcf per day in four New England industrial states. Total deliveries will be about 45,000,000 Mcf per year, equal to some 1,730,000 tons of solid fuel. Along with Texas Eastern, Algonquin, Northeastern and Tennessee natural-gas companies have also filed applications for permission to carry gas to New England.

LPG—Added to coal's troubles, liquid petroleum gas is becoming a larger contender in the home-fuel market. Between 1935 and 1948, LPG sales for domestic use in-

creased from 21,380,000 to 1,540,000,000 gal, while total sales for all purposes rose from 76,855,000 to 2,600,000,000 gal in the same period.

Here again, a competitor has hit in areas where coal traditionally is strong. In New England, for instance, between 1945 and 1948, LPG customers increased 240% from 5,000 to 17,000; Middle Atlantic, 250% from 6,000 to 21,000; East North Central, 854% from 11,000 to 105,000; South Atlantic, 372% from 11,000 to 52,000. Ease of delivery, reasonable price, small storage space, cleanliness, convenience, dependable supply and good service by the supplier have been big factors in the growth of this fuel.

Further strengthening natural gas and LPG in the home field, several gas utilities are switching over from manufactured to mixed gas or from mixed to natural gas, thus replacing coal-made gas and, in some cases, releasing fuel oil, formerly used for enriching manufactured gas, for competition with coal. Reported changeovers by nine companies in the East and Middle West in 1949 involved a total of over 462,000 customers, most of them residential.

The conclusion suggested by these figures and others is that though price and convenience are factors in determining the course of the home-fuel market, dependable supply also is a strong factor—perhaps the strongest, with price differences as narrow as they are.

Railroads

Diesels Gain Favor

More Dollars Go to Oil

Strikes a Big Factor

Gas Turbine Coal's Hope

On the railroad front, lower operating and maintenance costs, higher efficiency and better availability have made the diesel-electric locomotive an attractive investment for passenger and freight service, with the result that in 1949 over 7,000 diesels were in service or on order against about 500 in 1939. In 1941, diesels pulled 0.25% of all freight and 7.5% of all passengers; in 1948, 21.25% and 39.5%, respectively. In 1949, they pulled over 30% of total freight traffic. Of the 1,577 new locomotives put into service in the first 10 months of 1949, 1,524 were diesels and 53 were steamers.

Put another way, dollars paid out by the railroads for fuel have gone more and more to oil producers instead of coal companies. Table II shows how the trend has gone in the past three years. If this trend continues until 1970, as predicted by an official of Standard Oil of Indiana, the railroads then will be using 9% of the nation's oil output. This will not be because the railroads dislike coal, their biggest customer, but largely because diesel power is cheaper than steam power. For example, in November, 1949, R. B. White, president, Baltimore & Ohio R. R., reported that diesel power in freight, passenger, yard and helper service for the first 10 months of the year had saved the company $9,587,000. Modernization of some steam power, he added, had saved about $686,300. These figures point up the fact that the up-to-date diesel is a vast improvement over earlier models and that comparable improvements have not been applied generally to steamers.

STRIKE EFFECTS—However, though the price-and-efficiency picture favors the diesel, the railroads' changeover certainly has been hastened by coal strikes. Fig. 2 bears out this conclusion, showing a descending saw-tooth pattern of coal purchases, with the big declines corresponding to mine stoppages in the past three years.

In April, 1947, with the miners out for a week, with revenue passenger-miles steady and freight ton-miles down about 5%, coal purchases were down 23.4% from March while diesel-fuel purchases held steady at 63,000,000 gal. In March and April, 1948, when the mines were shut down for four weeks, total coal purchases in the two-months period were down 30.1% below the total in January and February and down 28.4% from March and April, 1947. Meanwhile, diesel-fuel purchases were up 6.4% from the total in January and February and 49% above the total for March and April, 1947. In the same period, passenger-miles were down 7.9% and freight ton-miles were down 5.1% from the total in January and February, 1948, and down 14.2% and 9.8% from the total in March and April, 1947.

In 1949, the decline in coal purchases and the upsurge in diesel-oil purchases continued, geared significantly to strikes and the three-day week. Revenue ton-miles in March, when the mines were down for two weeks, were up 3.6% from February; revenue passenger-miles, steady. Coal purchases in March, however, were 12.9% below the figure for February; diesel-fuel purchases, up 18.9%. Compared with March, 1948, ton-miles were down 10.7%; passenger-miles, down 16.2%; coal purchases, down 14.8%; diesel-fuel purchases, up 38.7%.

Later in 1949, in June, July and August, while the miners were idle for a week, took a 10-day vacation and started their three-day work week, total coal purchases dropped 26.8% from the preceding three months, diesel-oil purchases rose 7.2%, ton-miles were down about 8% and passenger-miles rose about 19%. Compared with the same three-months period in 1948, coal purchases in 1949 fell 40.7%, diesel-oil purchases increased 30.7%, freight ton-miles dropped about 23.5% and passenger-miles fell some 15%.

FUTURE OUTLOOK—The outlook for coal's immediate future in the railroad field, therefore, like the history of the past three years, is not bright. It will be hard to do more than slow down the advance of the diesel.

Over the long haul, however, the prospect is better. Developments now in the making may reverse the trend in railroad-fuel use and re-establish coal as a major contender in this market. At present, studies and tests are aimed at electro-drive locomotives using either a coal-fired steam turbine, an oil-fired gas turbine or a coal-fired gas turbine. Already, encouraging efficiencies have been obtained from a coal-fired steam-turbine locomotive now in service for the Chesapeake & Ohio Ry., and recent road tests of oil-fired gas-turbine locomotives on Union Pacific tracks and elsewhere have indicated low costs, high efficiency and a minimum of maintenance, suggesting that a coal-fired gas-turbine locomotive would give similar results.

LDC LOCOMOTIVE—Development of a coal-burning gas-turbine locomotive, in fact, already is well under way, with road tests promised before the end of 1950. John I. Yellott, director, Locomotive Development Committee, BCR, reports that in November, 1949, a single combustor (the actual locomotive will have two combustors) burned coal at rates up to 1,200 lb per hour and drove a 1,500-hp turbine without interruption for 40 hours on a test stand. Full-size turbines are about ready for delivery,

Table II—How Much Money Railroads Spent for Fuel

	1947	1948	Through July, 1949
Diesel oil	$ 58,677,975	$121,544,114	$ 77,442,710
Percent change from preceding year		+101.7	+17.3
Price per gal.	7.33c	10.07c	9c
Mine-purchased coal	$395,611,408	$454,909,651	$202,266,769
Percent change from preceding year		+7.1	—23.8
Price per ton	$3.64	$4.34	$4.38

Table III—Utilities Fuel Use, Third Quarter, 1949

	Percent change from preceding month			Percent change, total quarter, against same quarter, 1948
	July	Aug.	Sept.	
Coal	—2.5	+9.4	— 5.9	— 20.2
Oil	+9.8	—0.1	+ 6.9	+101.7
Natural gas	+6.8	+8.4	—10.5	+ 12.9
Power output	+0.4	+5.5	— 4.4	+ 2.1

if they have not been delivered already. A ball pulverizer, producing 92% minus-200 mesh and almost no plus-100 mesh, has replaced the atomizer originally planned for the handling-and-feed system and a pump of unique design has been built to feed an even flow of powdered coal under continuous pressure. Fly ash is withdrawn from the gas stream in two stages—through a louver separator to remove coarse particles and then through a bank of cylindrical separators to remove fine particles.

The LDC locomotive, when finally on the rails, will comprise two articulated units, one end for coal storage and handling and the other for combustors, turbine and electrical equipment. There will be a cab at each end.

As for cost, at idling speeds the coal-burning gas-turbine locomotive will cost very slightly more than the diesel but at half load or anything over, operating cost will be half or less than half of diesel and considerably less than the cost of an efficient oil-burning gas-turbine locomotive. With about 40% of diesel-locomotive maintenance chargeable to the engine itself, the coal-fired gas-turbine locomotive, with its relatively few moving parts, is expected to require little maintenance.

RECOVERY—Recapture of the railroad-fuel market, however, will not come overnight after the first trial runs of the new coal locomotive. Recovery will be slow, much like the early rise of the diesel, and speed will pick up only as present diesel equipment becomes obsolete. In addition, replacement of diesels will be much more complex than simply hoisting the old diesel engine out and lowering coal equipment into place. Coal-handling and burning equipment, the turbine itself, and coal and fly-ash storage will require lots of space—more than a diesel engine and its fuel tanks require. The undercarriage and some parts of the electrical equipment are about all that will be salvageable from an old diesel locomotive when a coal-fired gas-turbine locomotive replaces it.

Industry

Coal-Use Trend Is Down

Strikes Spur Changeovers

Oil and Gas Sales Grow

Quality, Price Are Factors

Coal is faring little if any better on the industrial front. Here again, as in other fields, the descending saw-tooth pattern of coal use developing over the past three years (Fig. 3), with the high mid-winter peaks shading off to successively lower levels and the summer valleys dropping lower year by year, is evident. This general downward trend, compared with the general upward trend of the *Business Week* index of business activity, has been accelerated by periods of idleness in the mines.

COAL—Take March and April, 1947, for example. In April, the miners were out for a week. The business index dropped only from 189.9 in March to 186.3 in April, while coal consumption by cement mills and other industrials dropped 20.2% from 14,566,000 to 11,627,000 tons. Later, between January and April, 1948, while the miners were out for four weeks, the business index dropped from 194.4 to 188.4 while coal used by cement mills and other industrials dropped 37.4% from 12,679,000 tons in January to 7,941,000 tons in April.

In 1949, the miners stopped work for two weeks in March and a week in June and then started their vacation. Over the March-June period, the business index declined from 192.3 to 183.3. Coal consumption by cement mills and other industrials meanwhile fell 35.9% from 10,584,000 tons in March to 6,780,000 tons in June.

NATURAL GAS—Over the three-year period 1947-49, utility sales of natural gas to industrial customers moved generally upward. In the second quarter of 1947, for example, while coal use was off sharply, gas sales increased 12.2% from 335,000,000 to 376,000,000 Mcf. In the second quarter of 1948, when the effects of the month-long mine shutdown in March and April were most apparent, natural-gas sales to industrial customers increased 20.3% over the preceding quarter and 6.7% above the second quarter of 1947. Coal meanwhile dropped 11.7% from 8,992,000 tons in February to 7,941,000 tons in April, 1948.

In the second quarter of 1949, when the effects of the March and June shutdowns and the miners' vacation were felt, coal use was 27% below the preceding quarter and 5.5% below the second quarter of 1948. Meanwhile, natural-gas sales to industrial customers in the first quarter of 1949 were 13.1% above the preceding quarter and 7.8% over the second quarter of 1948.

USER REACTION—These trends are backed up by spot reports from scattered areas throughout the nation indicating that, unless dependable supplies of coal are made available, coal will continue to lose ground. For example, from a survey of its membership in the fall of 1949, the Purchasing Agents Association of Chicago learned that out of 445 members replying to a questionnaire, 45 planned to change from coal to another fuel. These 45 men now buy 498,000 tons of coal per year. Eighty-five members had changed or had seriously considered changing to another fuel because of "conditions in the coal industry."

The same attitude prevails in other sections of the country. A

Utah purchasing agent recently wrote: "I feel rather pessimistic as to the future of coal in this part of the country. . . . Oil is rapidly becoming more plentiful hereabouts and gas has already made considerable inroads. People in general are disgusted with the ease with which John L. Lewis and his crowd can shut off the supply of coal at a moment's notice and cause needless suffering and financial loss. It seems to me that coal will be unpopular and people will be willing to purchase a substitute fuel—even at a higher cost—as long as John L. Lewis, or anyone for that matter, is able to shut off the supply at will."

Another business man in close touch with the buying habits of industry recently wrote: "The recent three-day and no-day work weeks proclaimed by Mr. Lewis did not, apparently, create the shortages that were no doubt expected and intended from the reduction in coal production. They did, no doubt, spur the movement to other fuels, because people do read the papers and the first obligation of the head of a house, as well as the management of an industrial operation, is to have an assured source of supply for all essential commodities."

A New England purchasing agent reports: "Generally speaking, if the coal industry were more stable, the trend to oil would be less general than it has been in recent years."

QUALITY AND SERVICE—Speaking of his company's operations in Maryland, a purchasing agent for a large manufacturer of consumer goods states: "For the last five or six years we have encountered sporadic difficulty in maintaining a uniform flow of good-quality coal. This is attributed to intermittent strikes, of course, interruption in railroad service due to car shortage and mine operations. All of these facts have tended to make us dissatisfied with coal as a fuel." Enlarging his view to take in general industry, he concluded: "It is my opinion that unless the leaders in the coal industry take positive steps toward maintaining quality and service, they will lose many customers to other fuels even though the switchover may only be accomplished at a higher fuel cost per pound of steam."

Finally, a purchasing agent for a large manufacturing company in New York state, pointing out that his company has changed from coal to oil "only to a limited extent" in some of its larger operations in the past 9 to 12 months—"and this may be temporary only"—reports that there are "several small concerns in this area that have switched from coal to oil, feeling that the supply will be more certain and that they will have fewer worries."

Electric Utilities

Plants Built for Any Fuel

Supply Determines Choice

Oil and Natural Gas Gain

Coal Still the Mainstay

Coal always has been the major source of energy for electric utilities. In 1948, coal accounted for 53.8% of the electric power generated. Electric-power spokesmen have predicted that coal will continue to play this role through the years ahead, rising to 57.7% in 1960 ("Coal's New Era," *Coal Age*, January, 1949). In spite of their views, however, coal is in for some rough sledding in the future unless power-plant managers can be assured of a dependable supply.

NATURAL GAS—Natural gas, as an example, has moved into the electric-utilities market with increasing strength. Use of natural gas as an electric-utility fuel is seasonal, being high in the summer, when domestic demand is low, and low in winter, when home owners and apartment dwellers get first call on gas mains (Fig. 4). However, the summertime peaks and the midwinter lows in natural-gas use by the utilities have reached higher in each of the last three years, as the figures below show:

Natural Gas Used by Electric Utilities

	August peak (Mcf)	February low (Mcf)
1947.....	42,000,000	21,000,000
1948.....	52,000,000	28,000,000
1949.....	60,000,000	31,000,000

OIL—Fuel oil used by electric utilities also has trended generally upward, though the annual cyclical pattern is not as regular as that of natural gas. In January, the peak month of use by electric utilities, consumption in 1947 was over 4,418,000 bbl; in 1948, slightly higher at 4,433,000 bbl; and in 1949, much higher—5,356,000 bbl. The cyclical annual climb in oil use, which began in June in 1947 and in July in 1948, began in May in 1949 and continued upward pretty sharply through September, when the utilities used more oil than in any other month in the 33-month period—5,810,201 bbl.

COAL—Coal meanwhile has suffered by strikes. In the spring of 1948, when the miners were idle for four weeks, coal use by electric utilities — bituminous, anthracite and lignite—dropped from 8,222,000 tons in February to 8,134,000 tons in March, and, as the shutdown continued, went down to 7,248,000 tons in April—a total decline from February to April of 11.8%. Power output in that period held fairly steady at 22.2 billion kw-hr in February, 23.5 billion in March and 22.4 billion in April. At the same time, oil used increased 6.3% from February to March and declined only 10% from February to April. Use of gas increased 14.8% in a steady climb from February to April.

In 1949, coal's losses again were synchronized with mine stoppages. While power output rose 7.8% from February to March, coal use rose only 2.6%; natural gas consumption, 16.2%. From February to April, with power production rising 1.8%, coal consumption declined 11.4%, oil use declined 15.8% and natural-gas use increased 32.3%.

In June, 1949, while power output rose from 23.3 billion kw-hr in May to 23.6 billion kw-hr in June, oil use was up 20.2% above May; gas, up 15.4%; coal, up only 3%.

Table III gives data for the third quarter, 1949. Coal's figures do not make pleasant reading. One further fact about the utilities-fuel situation in 1949 is worth noting: whereas in 1947 and 1948 coal use held steady from April to May and increased from May into fall and winter, in 1949 coal use declined 2.8% from April to May and, for the six months April-September, fell 16.4% under the total for the same six months in 1948. Meanwhile, oil use rose 5.9% from April to May and gas use was up 12.2%. In the six-months period, total oil consumption in 1949 was 57.9% higher than in the same period in 1948; gas use, 15.3% higher.

CONVERTIBILITY — Though the downward trend in coal use by the electric utilities runs counter to most predictions, executives still hope to rely on coal as the major fuel in the years ahead. But, as one spokesman put it recently, "Electric utilities will not put themselves at Mr. Lewis' mercy." He pointed out that practically all modern power plants are built to burn either coal or oil. The drop in coal use in 1949, he explained, though due in part to increased

coal-burning efficiency and an adequate supply of water for hydro plants, is due primarily to the ease with which the utilities can turn to other fuels when their supply of coal is threatened.

Stockpiles of coal held up well in recent mine stoppages. Between March 1 and May 1, 1948, while the miners were out for four weeks, days' supply in electric-utility stockpiles dropped only three days —from 60 to 57. Between March 1 and April 1, 1949, with the mines closed for a week, stockpiles held steady at 100 days' supply. Between June 1 and July 1, with the mines idle for a week and miners starting their vacation, days' supply fell only seven days—from 136 to 129. Finally, between July 1 and October 1, with the miners' three-day and no-day work weeks, coal on hand dropped only one day's supply —from 129 to 128.

Thus convertibility in power plants effectively clips Mr. Lewis' wings in one quarter at least—a fact reflected in his obvious disappointment that stockpiles were not whittled down to the danger point in 1949. But, while power-plant convertibility put Mr. Lewis in a tight corner, it also made it easy for a big coal customer to turn elsewhere for fuel.

THE FUTURE—Over the long pull, as explained earlier, utilities hope to rely on coal to fuel an increasing supply of electric power. "But unless Mr. Lewis mends his ways," a utilities executive warned a short while ago, "the trend against coal may continue."

How Coal Can Build Up Its Future

- **Add Sparkle to Sales**
- **Put Speed in Research**
- **Cut Production Costs**
- **Solve Labor Problems**

If coal has weakened in competition with other fuels over the past three years—and the figures show that it has—high prices and interrupted supplies must take a big chunk of the blame. The opportunities in 1949, though perhaps not so ample as they were during the war and the immediate postwar years, still were real and inviting, as stated earlier.

Over the long haul, the outlook for coal still is as good as it was a year ago, when *Coal Age* published "Coal's New Era." Demand for energy will grow through the years as population grows, living standards rise, demands for goods, services and new products increase, and new industrial processes emerge. Coal should share in this expansion —and will if it can stabilize its operations, keep costs down, speed its research and technology and add sparkle to its merchandising.

This long-term optimism is borne out by an informed observer in close touch with power and electrical-equipment operations, who recently wrote: "In spite of all the troubles in the coal industry in the last few years, we still feel that it is the leading industrial fuel and will continue to be so for many years to come." His faith in coal is echoed in a similar statement by an industrial purchasing agent in the Rocky Mountain region, who said: "The long-term outlook for coal as an industrial fuel, in my opinion, is much brighter. The mines are becoming more efficient, the supply is unlimited and the cost has always been and will continue to be less than other types of fuel."

Bearing in mind these optimistic predictions, what can coal do to nail down its share of the fuel market on all major fronts and grasp the opportunities that brighten the outlook?

At least some of the answers will be found in the following course of action:

HOME FUEL

Producers, shippers, mine officials and retailers all must share responsibility for strengthening coal's position on the domestic front. In the tasks ahead, they should work separately and collectively along these lines:

Producers and Shippers

1. **Full backing** of and participation in Coal Heating Service Division, National Coal Association. CHS warrants the moral and financial support of producers and needs their counsel. Shipper salesmen also could be effective agents for spreading CHS doctrine among retailers—clean, courteous, careful deliveries of coal to home customers and the benefits of stokers and automatic controls.

2. **Adequate dollar support** for industry-wide and company research to speed development of improved ash-removal stokers, smokeless stoves and better hand-fired equipment. Compared with research spending by other major industries, coal's research appropriations to Bituminous Coal Research, Inc., and the Anthracite Institute are meager.

Mine Officials

1. **Improved domestic-coal quality,** with less dirt, fewer fines and more uniform size.

2. **More stable labor relations** on the local level, thus assuring home owners of an adequate and dependable supply of solid fuel the year around. Sharing information about coal's markets and customers' needs with workers is one way to win their cooperation.

Retail Dealers

1. **Smart, aggressive promotion** of stokers and automatic controls, with stress on convenience, economy and cleanliness. A major stumbling-block to the sale of a stoker is price, compared with an oil or gas burner. Price can be cut by volume sales, enabling manufacturers to produce stokers at lower cost per unit. Stoker-installation cost can be cut by employing skilled mechanics, thus reducing service calls during the guarantee period and saving the customer the annoyance and expense of repair bills in the years following. One suggestion for coal retailers who want to boost stoker sales is that stokers be sold at or below cost, the retailer counting on repeat sales of coal to produce his profits. Manufacturers of safety razors have found this a sound sales program.

2. **A shift in sales methods.** Many retailers stress short-term reserves, high prices and explosion hazards of competing fuels. Other retailers simply wait for the telephone to ring. It is high time to stop unselling other fuels and begin selling coal. Coal has merits of its own and, with smart salesmanship, can be sold on these merits.

3. **Narrower profit margins,** together with efficient yard and delivery operations, thus lowering prices to the customer and encouraging volume sales.

4. **Continuous upgrading** of quality, delivery and service standards along the lines laid down by CHS.

ALL MARKETS

On the electric-utilities, railroad and industrial fronts, as well as in the home-fuel market, operators and mine officials should act along several lines to assure coal of its

rightful share of the fuel market. Here are a few of the things that can be done:

1. Full moral and financial support of the industry's research programs. Both BCR and the Anthracite Institute are seeking new uses for coal, better burning methods and equipment and new preparation and beneficiation processes to increase coal's usefulness and efficiency in industry and its cleanliness, convenience and comfort in homes. As stated earlier, dollar appropriations for these studies are inadequate for simultaneous advance on all projects and are not in keeping with the stature, income and need of the coal industry. Research pays off over the years, not at once. Men of vision in the industry must "sell" research to those who watch only the day-to-day trends but fail to see long-range needs and benefits.

A case in point is the work of the Locomotive Development Committee of BCR. When brought to a conclusion, this project promises to recapture a big share of coal's losses to the diesel, benefiting the entire coal industry by application to locomotive use and possibly to marine and stationary power-plant use.

2. Better promotion of research results to the industries that will benefit by them. It is not enough to provide money for development of new equipment and better burning methods. Over-fire air and steam jets, improved ash-handling facilities, better grates and other improvements are worthless until put to use. No better channel exists for passing this information along than the relationship between a coal producer and his customer.

3. Improved quality and better preparation of coal to meet the specific needs of individual customers. How improved quality pleases customers shows up in a letter in November from the purchasing agent for a consumer-goods manufacturer in Kentucky. He wrote: "Quality did deteriorate during the war, but this year we were successful in signing a penalty contract whereby the supplier incurs a penalty in the event the coal does not meet the specified Btu, ash and moisture contents. This has resulted in a much more satisfactory operation." In this case, better-quality coal won the approval of a big customer. It can do the same in other fields—railroads, utilities and homes.

4. Further investment in new-type machines and in further research that will bring forward still better machines and equipment to cut labor costs and restore coal's price advantage. At present, the price situation is touch-and-go between coal and other fuels, as pointed out by a purchasing agent from Kentucky. He wrote: "About six months ago it became economically possible to substitute fuel oil for coal. However, in the last several weeks the fuel-oil market rose to such an extent that we have converted back to coal. A moderate increase in the current price of coal will result in our shifting back to oil again."

Installation of the first continuous mining machines in some mines in the past year is a big move in the direction of cutting cost, but much remains to be done in matching timbering, transportation and preparation-plant speeds to new-type face operations. Progress already being made by the Mining Development Committee of BCR heralds further advances in mining practice leading to more economies for all coal producers. The MDC deserves the continuing support of producers who already have subscribed and the added contributions of producers who stand to gain by its work.

5. Better use of existing machines and manpower. The starting point in this area is better foremanship, created by bringing foremen into partnership with top management, making the most of their experience in up-dating methods and installing new equipment and giving them the training they need to get the best from their crews.

6. Improvement of public opinion of coal. Big strides have been made in recent years to show the American people that coal is vital to our industrial and economic system, that the industry is strong and progressive, that its workers are well off and that coal can be burned efficiently, conveniently and without dirt or smoke. One result, noticeable in the past year, is that Mr. Lewis' charge of callousness, greed and obstinacy among operators have provoked little if any sympathy for his point of view. That is a real gain.

However, much remains to be done public-relations-wise, a great part of it by the producer and his associates in their own cities, towns and market areas. The starting point is putting his own house in order—that is, a good product, safe working conditions, high mining-community standards, efficient operations and a contented working force. These things accomplished, the next step is spreading the word abroad through speeches, cordial relations with local newspaper and radio men, and the enthusiasm of his own salesmen and workers, who are the strongest public-relations tools he can command.

7. Solution of the industry's contract-bargaining problems. At first glance, coal seems to have lost ground in this area in the past year. However, out of the troubles in 1949 there may come a solution at last. Mr. Lewis did not have his usual easy sailing last year. His miners, idle much of the time and on half pay for 10 weeks or more, grumbled more than usual as the year wore on and, as 1949 neared its end, still had no gains but a lot of losses, including the welfare-fund shutdown, to show for their troubles.

On the other hand, the strong, united stand of the operators against contract terms that would add to the price of coal won a lot of goodwill for their cause and strengthened their hope that they would lose less by standing together than by collapsing singly or in small groups. Their leadership was strong and vocal and their contract proposals made good sense.

Whether Mr. Lewis ever will be persuaded to join the coal industry—that is, to help it rather than to hurt it—remains to be seen. But whatever he may do, there is no escaping these facts:

- **MINERS,** as well as their union, suffer or thrive with the changing fortunes of the coal industry. All three groups—workers, union officials and mine owners and officials—have shared in the good years of recent memory and have a big stake in the years ahead.
- **MR. LEWIS,** more than ever in 1949, has kept the industry, its customers and its workers unsettled and has made it impossible for the industry and the people most interested in it to cash in on their opportunities.
- **THE YEARS AHEAD** can be good for coal. As they have done in the past, miners will get their fair share of the good things in the future, provided they are permitted to work.
- **INDUSTRIAL STATESMANSHIP** has emerged among the coal operators. It is time for the union to discover similar talents in its leadership.

TRACK LOADERS insure high tonnage per man at Emily mine in spite of retreat operation, pillar mining and adverse conditions.

How Emily Gets High Efficiency

Mine Tonnage Increased With No Drop in Over-All Efficiency in Spite of Change to Retreat Operation—Pillar Plan Insures Rapid Extraction Under More Adverse Conditions—Roof and Water Are Problems

By A. D. SHOWALTER, Vice Pres., Monongahela Rail & River Coal Corp.

USING THREE TRACK LOADERS and producing primarily from pillars in retreat work, the Emily mine of the Monongahela Rail & River Coal Corp., operating in the Pittsburgh seam at Maidsville, Monongalia County, W. Va., is achieving an efficiency of almost 21 tons per man-shift in the sections and approximately 12 tons per man employed in spite of an adverse change in mining conditions. Total mine production also has been increased as a result of the improvement in mining efficiency, arrived at through the joint efforts of the executive organization headed by H. W. Showalter, president, and A. D. Showalter, vice president, and the mine staff, including Thomas E. Griffith, superintendent, and Arnold Phillips, maintenance superintendent.

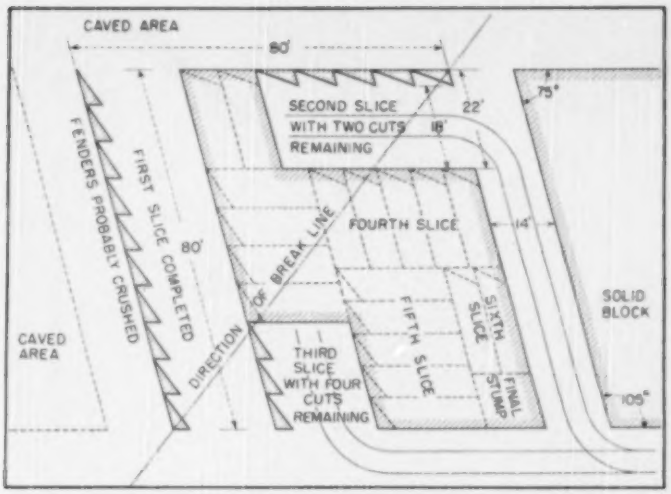
Leaving Top and Bottom Coal Simplifies Mining—Emily mine is a drift operation some 5 mi below Morgantown, W. Va., on the Monongahela River. Total seam height is approximately 96 in. However, only about 78 in of the seam is loaded. The remainder consists of 12 to 18 in of lower-quality coal in the top, left for roof protection, and 3 to 6 in of bottom coal not recovered because of impurities. The portion of the seam loaded contains the best of the coal and is clean except for the two thin bands of bone, characteristic of the Pittsburgh seam, and an occasional sulphur ball.

Above the seam is the usual Pittsburgh crawslate and above that are shales and sandstones that can be troublesome if good mining is not practiced. Below the coal is the usual clay bottom. The general dip is northerly and averages less than ½%, with local pitches as high as 7%. This grade irregularity produces pockets or swamps where water accumulates, necessitating the use of gathering pumps. As a safety measure, skids are placed under some of the cars of every standing trip.

The Sewickley seam, about 90 ft above the Pittsburgh in this section, has been mined and the old mines are full of water. The water from these old workings percolates through the strata to make Emily a very wet mine. In addition, the water is slightly acid and quite corrosive.

The mine was opened about 30 yr ago and was developed to the tip by a set of four main headings. The system of mining practiced is similar to that used in the coke region of Pennsylvania, except that crosscuts are turned at 75 instead of 90 deg, thus making the blocks slightly diamond shaped (see drawing). In development, the entries were driven 11 ft wide with a shear cut on each rib and a top cut under the roof coal. Crosscuts are driven 14 ft wide on centers slightly under 94 ft, so that the sides of the blocks do not exceed the 80-ft limit set by West Virginia.

Rapid Pillar Extraction Boosts Tonnage—Rapid extraction of the blocks is achieved by attacking them from the two protected sides. When starting a block, two places are driven simultaneously, one from each side near the caved area. These places are started 18 ft wide, leaving a 3-ft fender next to the cave.



EMILY PILLAR-MINING PLAN permits rapid extraction from two sides.

The place is top cut and sheared on the side next to the cave so that it drips through to the caved area at the back, thus leaving a wedge-shaped pillar about 8 ft long for protection.

Successive cuts are made in a similar manner until the block has been cut through and a similar but smaller block remains. This operation is repeated three times until a stump approximately 17 ft remains. This stump can be mined from either of the protected sides.

Good Roof Control and High Recovery Achieved—By this method and by maintaining a straight breakline at about 52 deg, good roof control and good recovery are achieved. The only coal lost is the top coal left for roof protection, the wedge-shaped fenders left for protection next to the caved areas and an occasional small stump which is shot out when conditions will not permit it to be mined with safety. Occasional clay veins, which occur in connection with minor faulting, make it rather difficult at times to maintain the schedule of operations necessary to keep a straight pillar line.

Crossbars are needed for roof support under the top coal. Size on haulage roads is 5x7 in; at the working faces, 4x6 in. Crossbars are kept to within 3 ft of the face, with not less than five crossbars over the loading machine at all times.

Coal is mined with track-type universal machines shearing and top-cutting. Hand-held electric drills are used for the shotholes and only permissible explosives are employed.

Loading is done with track machines served by cable-reel locomotives. One 8-ton gathering locomotive serves each loader, one 8-ton locomotive is used as a relay from the section partings to the main sidetrack, and two 10-ton locomotives, one pushing and one pulling, are used for the main-line haulage to the tipple.

The main line consists of about 1 mi of track underground and an additional 3,800 ft to the tipple. The mine cars are built of heavy steel, well reinforced, and have a capacity of about 6 tons. The underground track consists of 40-lb rail in the sections and 60-lb on the main line. The outside track is 85-lb. The underground track is bonded for return, but the outside track has welded joints and bonding is not necessary.

Cars are handled at the tipple in trips of four, with a small hoist moving them to a one-car rotary dump. Gathering pumps are 80 gpm and the main pump has a capacity of 500 gpm. Wrought-iron pipe is used in the sections, and because of corrosive action of the water, Transite is used in the main pipeline.

Dust-Prevention a Major Safety Activity—Even though the mine is very wet, regular rock-dusting is the practice and water is used on the cutter-bars of all machines. Each machine is equipped with a tank for this purpose. These tanks are filled with clean water hauled from the outside in special tank cars. A special oil car is used to bring in a supply of lubricating oil every day. It is equipped with a pump and a hose for filling the oil cans kept with the various machines.

Coal from the rotary dump passes over a screen. The coarse coal goes over a picking-table, where large pieces of rock are removed by hand, and then passes through a washer, where the coal is cleaned, sized and loaded for market. Reject averages about 12%.

Track-Mounted Equipment Meets Difficult Conditions—Track-mounted cutting and loading equipment has been used at Emily for many years and the mine is so wet that the use of off-track equipment would not be practical. Three track loaders are employed. Each crew consists of 11 men and one foreman in each section. Two additional trackmen are employed to maintain the switches in all sections.

The cost of producing coal must, of course, include all charges and must be calculated on the basis of shipments, which means clean coal. On the other hand, the performance of the machines and the men in the operation of the mine and the production of this coal must, in all fairness, be based on total tons loaded.

Some two years ago, one loading machine was being operated double-shift, with the other two single-shift. On this basis 50 men were employed in the sections, including the foremen, supplementary trackmen and haulage men. The mine was shipping about 1,200 tons of cleaned coal per day and, therefore, was loading about 1,360 tons with a total crew, inside and outside, of 115 men. Performance, therefore, was approximately 340 tons per machine-shift, 27 tons per man in the sections and nearly 12 tons per man employed.

High Efficiency Maintained in Retreat Work—The mine is now on retreat with a large part of the coal coming from pillars. Conditions are extremely difficult, with the handicaps including water and clay veins. The coal shipped with the same three machines operating seven shifts is about 1,600 tons per day, or 1,800 tons of raw material. Men engaged in loading total 86, with the total employed inside and outside 150. Consequently, present performance is better than 250 tons per machine shift and almost 21 tons per man-shift in the sections. In spite of this, over-all production, all men employed, is still maintained at around 12 tons per man.

MAZE OF OBSTACLES, surface and overhead, was successfully passed as dragline moved 2½ mi to new job. Cushioned railroads and highways, elevated high-tension lines and buried telephone and telegraph cables helped expert operator complete the job.

Dragline Obstacle Course

Eighteen Utility and Transportation Lines Crossed in Moving 135-Ton Machine to New Location—Utility Service Maintained and Equipment Undamaged During Successful Move by John Booth, Inc., Carbondale, Pa.

MOVING a Bucyrus-Erie 5W electric-powered dragline approximately 2½ mi from one job to another was accomplished with dispatch by personnel of John Booth, Inc., Carbondale, Pa., despite having to cross 11 railroad tracks, two highways, three high-tension transmission lines, a telegraph service line and a Bell Telephone toll cable along the route of the move.

The 135-ton walking-type dragline, equipped with a 120-ft boom, is moving overburden in anthracite strip mines located on each side of the Delaware & Hudson right-of-way between Carbondale and Jermyn in Lackawanna County. The obstacles were defeated as follows:

1

Railroad Tracks—Bridged

The first obstacle encountered was a series of seven service tracks to a coal storage yard of The Hudson Coal Co. The dragline was moved with bucket attached so that it could build ramps as it traveled. Such a ramp, built of native material was used to raise the dragline to the level of the service tracks. A cushion of loose earth was laid across the tracks to rail level, and 5x5-in timbers laid on this cushion bridged the rails under the pontoons. These timbers prevented overturning the rails from the scuffing action of the pontoons as the weight of the machine was raised. Rail traffic was resumed as soon as the dragline cleared the tracks and the timbers were removed, and clean-up of the dirt between the rails was done by a truck-mounted crane operating during no-traffic periods.

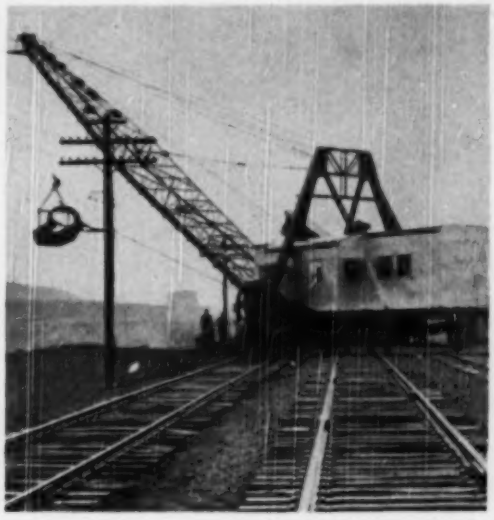
Service tracks and the main line are separated by storage area 25 ft lower than rail level. In moving across this area the dragline built a descending ramp from the service tracks into the storage area and an ascending ramp from the storage area to the level of the mainline tracks. A minimum of material was required for these ramps since the dragline moved dirt from the rear to the front as it traveled.

Cinders were used to provide the cushion on the two outer tracks of the main line, and crushed rock was dumped on the two inner tracks. These materials were used to prevent contamination of similar ballast already in place. Rails were bridged as previously outlined, with 5x5-in timbers under the pontoons. Power was carried to the machine through 3,600 ft of 5,000-v trailing cable, this cable being parted at a splice and passed under the rails to the dragline with enough slack to permit the crossing. A total delay of 68 min to railroad traffic was involved in the move across the main line, and the effect of this delay was minimized through coordination with Delaware & Hudson officials so that the move could be made during a slack period.

2

Utilities—Buried or Raised

Telegraph service in a line that parallels the main-line track was maintained by dropping the lines



ADVANCE PREPARATION, left, limits delay to rail traffic on main-line. Dropped telegraph lines and telephone toll cable are buried in fill of ramps to and from right-of-way. Photo at right shows use of 5x5-in timbers to prevent overturning of rails.

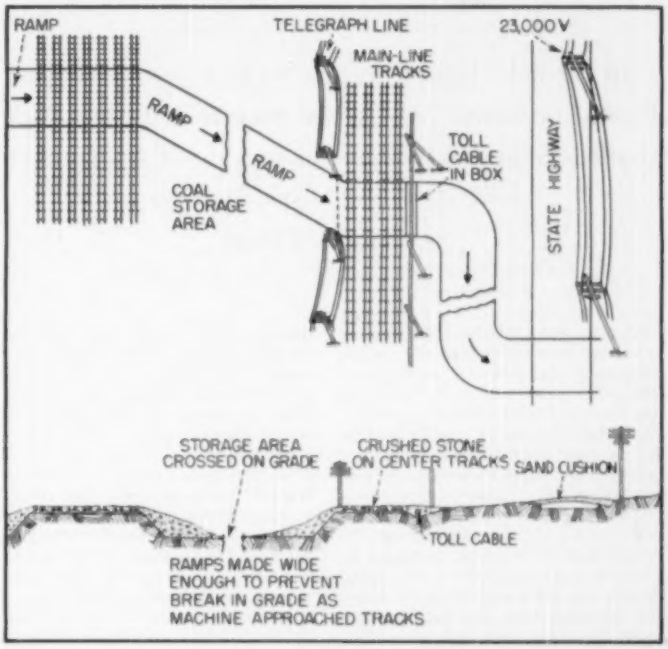
from poles adjacent to the crossing point and burying these lines with appropriate extensions in the fill of the approach ramp. Slack in the telephone toll cable was provided by dropping the cable from four poles on the opposite side of the main line. This cable was placed in a box conduit constructed of two 6x6-in timbers as side members and two 2x10-in planks, top and bottom, the assembly resting on a 12-in cushion of sand. This improvised conduit was buried to a depth of 3 ft in the fill of the exit ramp. As a result of this preparation, uninterrupted service was maintained and no damage to the cables was apparent.

Overhead high-tension lines, transmitting power at 23,000 v, were elevated at cross points by replacing the 30-ft poles with 60-ft poles. Two of the lines are operated by Scranton Electric Co. and the other by The Hudson Coal Co.

3

Highways—Cushioned

Highways crossed include a state highway and a county trunk road between Jermyn and Carbondale. Protection from the surfaces consisted of 6-in cushions of sand dumped on the highways ahead of the dragline. The material was easily removed behind the dragline, and was sufficient for the purpose since no damage to the highways resulted.



CONCENTRATED utility and transportation arteries along route of move indicate planning required. Five companies and two highway departments cooperated.

Careful preliminary planning and coordination among all companies operating utilities on the proposed route expedited the move and resulted in the least possible delays and no damage to equipment.

Charles A. Booth, president, and M. J. McHale, superintendent, John Booth, Inc., planned, coordinated and supervised the project.

FIG. 1—MINE DEWATERING STATION located at advantageous point combines four-mine 8,000-acre drainage area into one sump for economical pumping by vertical turbine units.

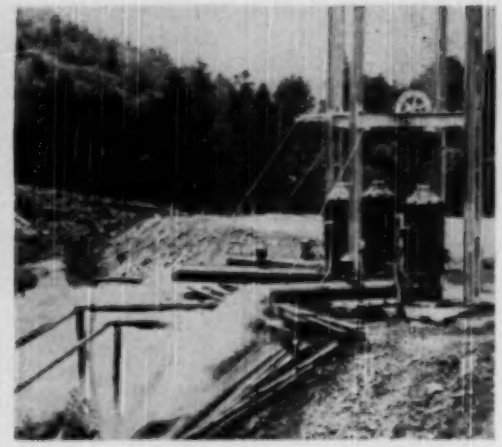


FIG. 2—THREE 5,000-GPM PUMPS installed on the surface (with fourth added later) have released 10 pump stations and 18 pumping units for savings of about $25,000 yearly.

Using Vertical Turbine Pumps

How Vertical Turbine Pumps Reduce Installation and Operating Costs, Simplify Maintenance and Meet Peak Loads in Mine Dewatering—Recommended Applications and Installation Considerations

By FENMORE E. DUNN
Chief Engineer, A. D. Cook, Inc., Lawrenceburg, Ind.

WATER HANDLING is a major problem at many mines. The magnitude of the problem reflects the ratio between quantity of water pumped and tons of coal produced. In certain bituminous fields this ratio is approximately 5:1; in certain anthracite regions this ratio may exceed 40:1.

The vertical turbine pump is ideally suited to mine dewatering. This type of pump is designed so that, at a minimum cost, the pump bowls can be installed in the sump in the mine with the driving unit far above on the surface. This feature provides many advantages.

It is not necessary to construct expensive pumprooms underground. The vertical pump is more economical and reliable where large and sudden inflows would jeopardize pumping stations at or below the drainage level. The responsibility for dewatering stations is removed from underground supervisors, and pillar recovery not possible with underground pumping stations is made possible. In many instances, it is possible to reduce the ventilation and trackage that would otherwise be necessary for pump-station maintenance. The need for explosion-proof equipment is eliminated and power is carried to the equipment at higher voltages with lower transmission losses.

The problem of mine dewatering is seriously augmented by the abandonment of worked-out mine properties whose drainage load is then imposed upon the neighbors who continue in operation. Where this is the case, dewatering is necessary under either one of two conditions: first, if the drainage is into the neighboring property as a result of location or inadequate barriers; and second, to keep the head of water against the barriers at a safe level.

The advantages of the vertical turbine pump for dewatering these abandoned properties are obvious. In most instances the pump can be installed over an existing opening, such as an airshaft. If such an opening is not available, or if it will not permit the installation of the unit at the proper level, the pump can be installed in a borehole drilled into the abandoned mine at a suitable point.

Similar installations provide the same advantages at producing properties. It is desirable, if possible, to install the pump in a shaft or borehole which does not handle downcast air. If, however, it is necessary to make such an installation, the pump manufacturer should be informed so that he can provide the necessary allowances for the differences in expansion between the lineshaft and the eduction pipe. Installations in upcast airshafts or boreholes, or under conditions of dead air, do not require those additional measures.

In locating a vertical turbine pump the sump should be the lowest practical point in the mine considering such outside conditions as depth of cover and accessability to power and transportation. The

Abstract of a paper presented at the 1949 meeting of National Association of Vertical Turbine Pump Manufacturers.

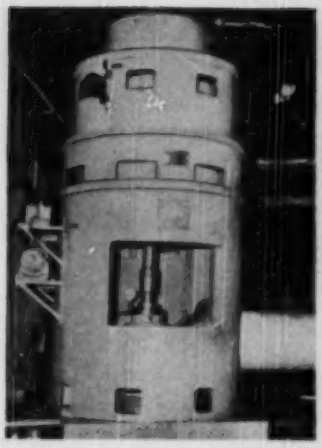


FIG. 3—600-HP UNIT dewatering abandoned properties utilizes stainless steel and rubber to handle 4,700 gpm of acid water.

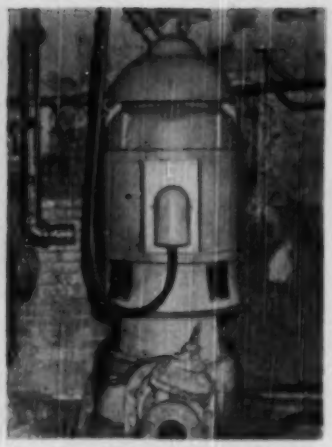


FIG. 4—ELECTRODE-CONTROLLED close-coupled unit on shaft bottom saves sump cleaning as backwash stirs up silt.

Vertical Turbine Pumps Offer These Advantages

- Installation of pump bowl in the sump and driving unit on the surface eliminates need for expensive pumproom, explosion-proof units and maintenance of special ventilation and trackage underground, makes sudden flooding of pump immaterial and permits use of high voltages on the surface.
- Utilization of airshifts or boreholes for pump lines reduces cost for dewatering both abandoned and producing mines.
- Special applications include close-coupling of pump and drive for shaft-bottom pumping and lodgement installations at reduced heads to prevent inflow.

sump should be located to take advantage of the fact that, during retreating operations, dewatering need be carried only to the point necessary for the maintenance of production, since with this type of equipment flooding of the pump station is not a factor. The pump station should be designed to handle the normal drainage load in 6 hr of pumping. This will allow for periodic inflows which may be twice normal and will also effect further economies by permitting dewatering in off-peak periods.

Careful planning in the location of the sump will possibly lead to combining drainage areas into a single sump and thereby effect further savings. Fig. 1 is a general view of a dewatering station planned with this in mind. Controllers for the motors are in the building beside the transformer station. The pumps are over a shaft constructed for this purpose. The sump services all or part of four mines with a drainage area of 8,000 acres. The pumps (Fig 2) are driven by 450-hp electric motors and each pump has a capacity of 5,000 gpm. A fourth pumping unit has been added since the original installation, bringing the combined load to 1,800 hp, and the combined capacity to 20,000 gpm. This station released 10 different pump stations and 18 pumping units, and has saved in power and labor about $25,000 per year, based on the 1940 wage scale.

Many mine waters are highly acid. This does not alter the problem or its solution but does require special attention to materials. The degree of acidity will dictate the materials to be used. As a general rule a pH value of less than 6 indicates that corrosion-resistant materials are required. For the higher pH values, the acid-resisting bronzes are satisfactory while the lowest values require stainless steels.

Lick Difficult Conditions

Fig. 3 shows a 600-hp vertical turbine installation dewatering abandoned mine properties. This unit handles approximately 4,700 gal of acid mine water per minute, with a pH value ranging as low as 2.5. The pump unit is made of Type 316 stainless steel with lead-tin babbitted bushings and wear rings. The 5-in shaft-enclosing tube is Type 316 stainless steel, as is the discharge elbow at the surface. The 16-in column pipe is completely rubber lined so that every part with which the water comes in contact is either Type 316 stainless or is protected by rubber. As a precaution against rising water, the bottom sections of column pipe are rubber covered and the bottom sections of the 3½-in shaft are Type 316 stainless.

The vertical turbine pump can be close-coupled so that there is a minimum distance between the pumping element and the driver. When so arranged the unit is particularly well adapted to shaft-bottom work. Fig. 4 shows such an installation. The pump is automatically electrode-controlled. This type of pump is capable of handling some silt and, when the pump is shut down, the backwash stirs up this silt and does not permit it to accumulate and pack, thus eliminating the necessity of cleaning the sump. The possibility of discharge lines freezing is eliminated and by-pass arrangements and drain lines are not required.

Another type of installation to which the vertical turbine pump is well adapted is lodgment pumping. A recent installation is in a shaft where water originates in the shaft itself. In this instance, the water is collected in a ring about halfway down the shaft and is removed by a vertical turbine pump with the motor on the surface. This type of installation has the double advantage of preventing water from entering the mine proper and reducing the head against which the pump must operate, thereby reducing power requirements.

The increasing application of vertical turbine pumps in coal-mine dewatering is the result of dependable performance. The high efficiency and dependable operation, gained only through surface-level pump stations, is leading, in many instances, to the abandonment of underground pumping plants. Careful consideration of this type of equipment for every dewatering requirement can lead to a more dependable and economical solution of this vital problem.

Acknowledgment: C. C. Ballard, The New River Co., Mt. Hope, W. Va.; discussion, West Virginia Coal Mining Institute.

New Equipment for More-Efficient Handling of Deeper Overburden Will Expand Reserves, While Product Acceptance Is Growing and Wise Reclamation Is Winning Over the Public, All Contributing to a Picture of a Sound . . .

Bituminous Stripping Future In Pennsylvania

By R. T. LAING

Executive Secretary, Mineral Producers' Association, Kittanning, Pa.

HOW LONG bituminous open-pit mining will last in Pennsylvania is a perennial question. Each year there is a revision of estimates and, in general, the revisions are upward.

The situation is somewhat similar to that existing in the fields of natural gas and crude oil. In the memory of the present generation there has never been a time when we have not been reliably informed that our natural gas and crude oil reserves could not possibly last beyond 15 yr. As we read these reports today, in times of discouragement, we think there might be sufficient supply of these competitive fuels *above ground* to last 15 yr.

No person could make, with any degree of certainty, even a remote guess as to the length of time it will take to recover the strippable coal in Pennsylvania. There has not been a comprehensive study made of the coal fields for many years. Any statement on strippable coal reserves would be entirely speculative. Even if we did know the fields correctly, we would, because of variable factors, have to change our guess from year to year.

What About Reserves?—Most of the easy coal is gone. The crop and first cut in quality seams with overburden under 35 ft, have been pretty well mined, or are in the process of being mined, with the possible exception of the very-thin seams in the low-volatile fields of central Pennsylvania. It is rather difficult to find today any sizable tract in the Pittsburgh, Freeports or Kittanning seams with cover that would permit economical mining with light or small machinery.

By small machinery we mean shovels or drags 3 yd and under. It was, and is, this type of machinery that produced the greatest percentage of strip coal in Pennsylvania. Individuals, partnerships and corporations with this type of equipment have, until the present, experienced little difficulty in going into the coal business and, in most cases, enjoying prosperity. What will happen when they encounter 50, 75 or 100 ft of cover to get at 48 in of coal or less is another question. Will they fold? Wear out their machinery bucking odds? Move to more fertile fields in other sections of the country? Or call the equipment manufacturers for aid? My guess is the machinery boys. These ingenious fellows have an uncanny way of turning up with the sensible solution to most any problem involving the movement of earth.

Most of the coal mined by the strip method has so far been classified as spotty. That is, there are, with few exceptions, no extensive beds with constant cover or seams. After the crop and the first and second cut on the contour, the operator moved on. He left plenty of coal but his equipment was too light to go into higher burden. The small operator could not afford to purchase the larger equipment required in the operation. Now, the question is: Will larger machinery move in on these partially completed jobs and finish the operation, or will the common rule, "a foot for an inch," continue to govern policy?

Small equipment is not burdensome. To move 35-yd or larger machinery, however, requires a considerable outlay of cash, effort and

time, and eats into potential profits. If the fields vacated by the small equipment are sufficiently extensive, the chances are that larger machinery will eventually move in.

Although quality certainly will enter into the picture, it will cause little concern. It is a well-established fact that a good seam of coal increases in quality in constant ratio to the depth of the seam or the thickness of the overburden. When machinery is made that will make it possible to remove as much as 100 ft of burden profitably, the acreage of strippable coal will immediately increase greatly. In addition to the areas where the crop and perhaps two cuts have been removed, there are considerable areas in proven seams with 100 ft of cover or under that have never been touched.

What About the Product?—There is a growing sentiment among brokers and consumers that "coal is coal." The method of mining is not disturbing as long as the fuel meets the specifications. These may vary considerably and, of course, cost is a great determinant when specifications are set up. Surface-mined coal is no longer a bad cat. With daylight cleaning, mobile picking-tables, central cleaning plants, modern blending facilities, well-trained coal inspectors, skillful combustion engineers and continuous analysis, it is difficult to peddle real estate.

Although most coal marketed today is skillfully prepared to perform well in any plant, if there should be failure those fuel experts known as combustion engineers are very versatile and can quickly adjust the plant to get maximum efficiency from any fuel. Btu per dollar is their measuring rod and it is difficult to persuade otherwise.

Even large consumers are going into the preparation business and often will take marginal or substandard coal at a price and reduce it to their own formula. Coals that formerly were objectionable on several counts are now finding a haven —and often a pretty good one. The large producer, also, is constantly discovering that proper blending of several qualities will very often result in a product surprisingly superior to one coal of established quality. Moisture, one of the bugaboos of light-cover coal, disappears as burden increases.

What About Men and Equipment?—The recently developed "mechanical continuous miner" used in deep mines is not giving the efficient strip operator too much concern. Although it is too early to predict performance and stability, especially in seams under 4 ft, the strip operator is presently able to detect costly accessories in connection with those in operation. He reads of the bothersome transportation and timber problems and thanks his lucky stars he is on the surface. He gazes with pleased astonishment at the costly coal-washing plants that seem to be necessary to give the product proper marketing qualifications.

There are a lot of other costly and bothersome problems encountered by the deep miner that do not keep the strip operator awake at night. The surface operator has no large group of supervisory employees required by law. He does not have to purchase locomotives and construct and maintain trolley lines and haulage roads. He has no ventilation problems and his safety program is simple and inexpensive. Technical advances in blasting have reduced this problem to nothing more than routine on the surface. His labor problems are small because of few classifications and the minimum of skilled workmen required. Aside from machinery operators, his employees are, for the most part, unskilled. There are a great many other items which produce a headache for a deep-mine operator that are not found in surface mining.

The strip-mine operator, however, has his own problems—many of them. What equipment he has is costly—very costly. Maintenance is especially expensive and the breakdown of a single unit might throw the whole operation into a tailspin. He has a haulage problem, also, in his highways. Roads must be in excellent condition at all times. A slow-up in truck travel is costly.

What About Weather and the Public?—Rain, cold, heat, snow, ice—all these pranks of nature—can worry the stripper no end. Also, there is the public. The soil conservationists view with alarm the disturbance caused by large shovels and draglines. The highway people are constantly watching the load limit. The aesthetic-minded and garden clubs abhor the common spoil pile and the disturbance of natural beauty. Water experts fear floods and pollution as the result of strip mining.

All these groups make a certain amount of protest. Some of this noise is, of course, caused by hysteria. In the face of argument, the conservationists can be reminded that 85% of the land disturbed was, prior to the mining operation, classified as sub-marginal or waste and had no present utility. The sincere conservationist also can be advised that the coal recovered by surface mining could not be recovered by any other method.

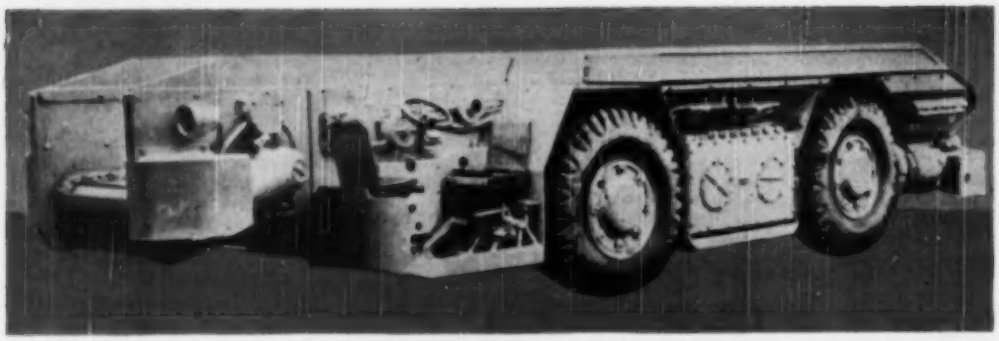
The state government in Pennsylvania, taking proper cognizance of the situation, has satisfied to a great extent these groups and given impetus to reclamation programs. Provisions of the Pennsylvania Open-Pit Mining Law are very constructive from the standpoint of reclamation and land utilization. The contour of every acre disturbed must be adjusted and the spoil planted in trees, shrubs or grasses. The operator must furnish a bond of $300 an acre to guarantee the performance of its requirements.

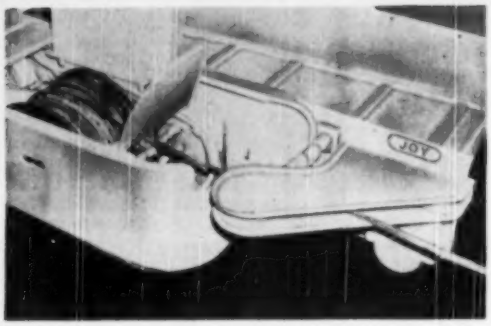
As a result, thousands of acres that had no utility whatever are now growing useful crops and the land owner is in good position to cash in at some later date on the profits from another crop. The Sanitary Water Board of the state can refuse a permit to mine if there are any indications that the operation will pollute clean water. Wise, just and equitable administration of these laws is resulting in general good as far as the land and the resource problems are concerned.

In the first nine months of 1949 Pennsylvania produced 69,803,750 tons of bituminous coal. Stripping accounted for 13,726,045 tons, or 19.7%. In the same period in 1948, total production was 97,987,415 tons, of which 25,361,725 tons, or 25.9%, was strip. These figures would indicate that the decline is in relatively good proportion. They certainly will not cause the strip operator much concern.

In 1948, the nation as a whole produced 599,518,229 tons of coal. Strip production was 139,505,920 tons, or 23.3%. The interesting statistics, however, is tons per man: 15.28 in strip mines compared to 5.31 in deep operation.

At the present time we see no indication of any more than normal slackening in strip-coal mining in Pennsylvania and, although the near-term outlook for the coal industry as a whole may be hazy, there is always the fact that our supply of natural gas and crude oil will only last 15 years. Then, of course, barring atomic energy, the most abundant fuel—coal—will come into its own.





GOOD ELECTRICAL MAINTENANCE, including controllers and cable reels, insures . . .

Better Shuttle-Car Service

How Shuttle-Car Operation Can Be Improved by Better Inspection and Maintenance of Electrical Parts, Including Wiring, Motors, Controls, Cable Reels and Circuit Breakers—What Recent Improvements Offer

By JAMES W. WOOLF, Electrical Development Engineer, Joy Mfg. Co.

NEW IDEAS and improvements in shuttle-car design have overcome many of the problems encountered in their operation. But new electrical problems will be created as more advanced mining methods are developed and higher production units are produced. These problems can be solved, as in the past, only by the combined efforts and the close cooperation of the machinery manufacturers, the federal and state mine agencies and the mining industry.

The shuttle car is especially adapted to moving material relatively short distances where total tonnages to be handled are not sufficient to warrant the installation of more permanent types of haulage. Some mines are using cars equipped with both cable reel and trolley pole. Thus it is possible to operate the car on the cable reel while it is near the face and then switch to the trolley for the longer haul to the discharge points. Cars have been operated in this manner over distances as great as 2,000 or 5,000 ft.

Dynamic braking is provided for cars operating over long, steep grades. This feature increases the safety in descending such grades by maintaining a safe operating speed independent of the hydraulic brakes. Speed of the cars varies greatly with load and grade over which they are operated. An average speed is about 4½ mph.

All cars in use to date have been designed to operate on direct current. The motor equipment usually consists of two series-wound traction motors of either 4, 7½, or 10 hp each, and a combination conveyor and pump-drive motor (compound-wound) of either 7½ or 10 hp.

Inspection and Maintenance

The electrical equipment on a shuttle car is subject to heavy intermittent loading. As a result, it is difficult to provide adequate protection for the motors, which must operate under practically stalled condition part of the time. The breaker or overload usually is set to trip only when an electrical fault, such as a short circuit or ground, occurs in the machine or trailing cable. Because of such severe op-

Abstract of a conference paper, Mining and Metal Industry Committee, presented at the 1949 meeting of the American Institute of Electrical Engineers.

erating conditions, when a failure occurs it often results in a burned-out motor or badly flashed controller. The only way to reduce such costly delays is by regular and thorough inspection followed by repairs of a permanent nature.

Loose Connections—All wiring should be examined for loose connections caused by vibration. Contacts should be kept clean and replaced before excessive burning results in contactor failure. Insulation should be checked and kept in good condition by regular cleaning and repainting with good insulation varnish. Spare electrical parts should be stored near the operating units to avoid delay in making replacements and to insure against makeshift repairs.

Control Circuits—The control circuit on a shuttle car should be tested occasionally to make sure it is operating correctly. This is easily accomplished by blocking out the line contactor to open the power circuit and observing the contactor sequence when the foot switch and master station are operated. A contactor which cuts out resistance may not be closing or it may be welded in closed position.

Motors—Motors that operate in parallel, such as traction or conveyor motors, should be carefully checked to see that they are both sharing the load. Such defects as this will not prevent operation of the car and may go undetected for some time, resulting in avoidable damage. The car should be in fresh air while conducting the test.

The power circuit of a resistor-type starter can be checked quickly by connecting a low-resistance ohmmeter across the power leads of the trailing cable and closing the contactors manually in proper sequence. By observing the ohmmeter, an open or short in the resistor circuit can be detected.

Arcing and Corrosion—All arcing devices, such as contactors and motors, are in explosionproof enclosures or housings. In a shuttle-car controller, this arcing is severe and when moisture also is present it results in the formation of nitrous acid. Some mines use a drying agent, such as silica gel, in the controller case to control this condition. This material comes in convenient cloth bags that must be replaced periodically. They can be re-used after the moisture has been removed by heating.

Ventilation offers another solution to this problem. This is accomplished by the installation of two explosionproof labyrinth fittings in the wall of the controller case. One is connected to a fresh-air blower and the other serves as an exhaust port. The blower drive can be provided by a separate motor or it can be taken off the continuously running pump motor. This equipment must be serviced regularly to prevent dust accumulations from restricting the air flow through the labyrinth fittings.

Care should be taken when making inspections and repairs to this equipment to maintain the explosionproof features incorporated in its design. Covers should be handled carefully to maintain a close fit and all fastenings should be replaced and properly tightened. Only by keeping the electrical equipment on shuttle cars exactly as received from the factory can the maximum safety be assured in their operation.

Cable Reels

The flexible rubber-covered cable which supplies power to the car, and the cable reel which automatically winds or unwinds this cable as the car approaches or leaves the cable-anchorage point, probably give as much trouble in the mine as any other electrical parts. The size of the reel is limited by the height and width of the car. Therefore, the quantity of cable also is limited. Reels accommodate from 300 to 600 ft, depending upon the capacity and number of conductors in the cable. The Federal Safety Code requires that three-conductor cable be used to provide a safety ground. Cables usually are No. 6 or No. 4 AWG and may be round, flat-parallel or concentric.

On the first cable-reel cars the reel was powered by a shunt-wound dc motor. This motor had sufficient resistance connected in series with it so that it could be stalled continuously while maintaining torque on the reel. This method proved unsatisfactory because of inefficiency and frequent motor failure. These failures often were caused by removal of part of the series resistance to obtain more torque from the motor.

Hydraulic-Reel Operation—Today cable reels are powered by a hydraulic motor driven from the continuously running hydraulic pump. This type gives much less trouble than the old electric drive but still is not perfect. When winding cable it produces a given torque regardless of how much cable is on the reel. Therefore, it must be adjusted for a full reel and, when the cable is nearly off the reel, the pull will increase inversely as the radius of the inner and outer wrap. This may result in cable tension three times that required for satisfactory operation. The torque is automatically reduced whenever the cable is being pulled off the reel by an unloading valve actuated by the reversal of the cable reel.

Spooling—The spooling device and the sheaves that guide the cable onto the reel so that it lays in uniform wraps are sometimes the cause of cable trouble. These must be kept well lubricated and free from accumulations of granulated material if they are to do their job of guiding spliced cable on and off. In many mines the cable lies in mud and water, and this is continuously carried onto the guide mechanism by the cable. No satisfactory cable-cleaning device has yet been developed.

Too much cable left wound on the reel when the car is operating over short distances will cause the cable to overheat. This is a result of poor ventilation of the closely wrapped portion. A remedy is to unwind the unused portion of the cable and lay it out of the way along the rib where it will receive adequate cooling.

The cable frequently is damaged by severe jerks caused by the inertia of the reel or movement of the car. These can be cushioned by a shock-absorbing-type cable anchorage consisting of a coil spring between the cable clamp and the anchor point.

Preventing Cable Breakage—Cable breakage is a serious problem on this type of car. Major causes are running over the cable or pulling it apart when it becomes entangled. Such failures are not only costly from a repair or replacement standpoint, but they result in lost production and create a fire and ignition hazard. When cables are pulled apart, temporary splices usually are made to keep the car in operation. These splices often result in further failures because of their weakness in both mechanical strength and insulating quality.

Such cables eventually are removed and taken to a repair shop where equipment is available to make a good vulcanized splice. A better but more expensive solution when the cable breaks is to replace the entire cable. This can be greatly simplified by the use of push-pull-type connectors attached to the reel. By stocking spare lengths of trailing cable equipped with these connectors, the cable can be quickly changed and hazardous operation

with spliced cables is eliminated.

Safer operation and reduced cable damage could be obtained if some visual or audible indicating device could be incorporated into the reel to warn the operator when he is approaching the end of his cable.

Circuit Breakers

Better electrical protection can be obtained by the use of a circuit breaker instead of a fuse at the anchor point of the trailing cable. These breakers are available in various types, the simplest of which is the single-pole railway-type breaker, which can be used in the positive line in place of a fuse. It provides instantaneous overload protection for the cable, reduces the danger of fires and is less likely to be made inoperative by the face repairman in his effort to maintain production.

Overcoming High Resistance—Occasionally, a short circuit or a machine-winding fault occurs where the resistance of the circuit prevents sufficient current flow to trip the breaker. A suggested system of protection involves the use of an instantaneous-overload-release circuit breaker, to which a shunt-trip coil is added in the ground conductor. This shunt coil can be set to trip on small values of current and will open the breaker in the event of a failure of machine insulation or contact between the ground wire and the positive wire in the trailing cable. Multiple-pole breakers in explosionproof housings are available and provide maximum protection when equipped with the above-mentioned ground-trip relay.

Recent Improvements

When fixed timers with resistors are used for starting traction motors, jogging the motors is the only way slow-speed operation can be obtained. This frequent operation of the traction controls on a shuttle car causes increased wear on the contactors and excessive heating of the starting resistors.

Series-Parallel Control—Improved operation and longer contactor life have been obtained by the use of series-parallel control. With this system the two traction motors are first connected in series. Then, after a fixed time of 1 or 2 sec they are connected in parallel. This system completely eliminates resistors in this circuit and also their problems.

Series-parallel control offers the additional advantage of two-speed operation. This is obtained by using a two-position foot switch. In the first, or slow, position, with the motors in series, the car can be operated any length of time since there are no resistors in the circuit to overheat. Slow speed is particularly useful when it is required that the car operate in close quarters, or where considerable turning is necessary. It is also an advantage when it is necessary to maneuver the car slowly behind a loading machine or up a discharge ramp.

A disadvantage of this system exists on two-wheel-drive cars because of the differential action between the motor drives on each wheel. When one of the driving wheels gets off the ground, it will spin freely on the series point and the car will start with a jerk when the transfer from series to parallel takes place. On the larger four-wheel-drive cars this problem has been overcome by the use of no-spin differentials between the pair of wheels driven by each motor. By using differentials of this type, power is supplied to all four wheels in both the series and parallel position even though one wheel loses traction.

Conveyor Drive—On some of the larger cars recently developed, the conveyor is driven by a pair of 5-hp motors mounted on each side of the conveyor at the discharge end. These motors are directly connected to a common drive sprocket. Series-parallel control is used to start and control these motors with advantages similar to those listed above for traction motors.

Disk Brakes—One of the most recent improvements on shuttle cars is the use of a hydraulically operated disk brake. This brake was developed during the war for heavy aircraft and, since its first use on a shuttle car May 28, 1948, it has won widespread praise for its dependability and ruggedness.

Its use has reduced electrical maintenance formerly caused by excessive plugging of traction motors. This practice is common on shuttle cars with worn brakes. When an operator finds that his brakes will not hold, he simply reverses the traction motors to stop the car. This type of operation often will continue until some failure completely disables the car.

Mercury Switches for Timing and Interlocking—The use of magnetically-operated mercury switches of the displacement type for timing and control-circuit interlocking have simplified control circuits and reduced maintenance on shuttle-car panels. These are completely sealed units mounted on the contactor frame and operated by the flux from the contactor operating coil. Some of the advantages of these auxiliary switches are:

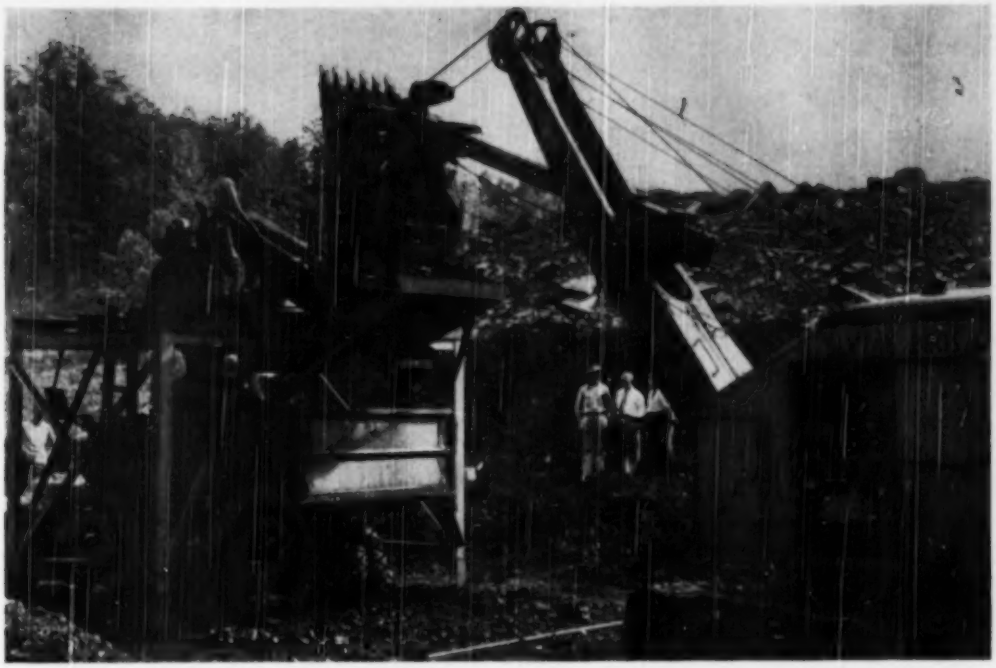
1. Elimination of operating failures caused by dirty or improperly adjusted control-circuit contacts on timer relays and mechanical interlocks, as well as the maintenance required to keep these contacts in operating condition.
2. Elimination of the need for adjusting timer relays to maintain proper timing.
3. Accurate timing unaffected by vibration and changes in operating voltages.
4. Maximum electrical clearance on controller panels by the elimination of the studs and connections of conventional circuit interlocks.

Low Voltage

Low voltage and voltage that fluctuates over a wide range result in inefficient performance and excessive maintenance in shuttle-car operation. Low voltage not only results in slower operation of the equipment but also is the cause of overheating of the trailing cable, car wiring and motors. The magnetic-type controller used to control these cars usually requires a minimum of 170 v for the 250-v car and 350 v for the 500-v car. This is the voltage required at the controller and must be 10 to 20% higher at the nips, or point at which the trailing cable is fastened to the mine supply feeder, to compensate for the voltage drop in the trailing cable. Too often this condition will not be recognized and corrected until it results in the failure of some piece of equipment. It usually first shows its effect by control failures; that is, failure of contactors or timers to operate correctly.

Special Operating Coils—Some manufacturers, after repeated requests by customers, have supplied special low-voltage operating coils for their equipment. These coils make it possible to operate cars originally designed for 250 v at voltages as low as 130. This practice is not recommended, but in special cases has proved economical.

Sluggish action of this equipment should call for immediate improvement in the power-distribution system. A recording voltmeter reading taken under peak-load condition is the best method for determining voltage conditions at the shuttle-car operating point. This record should be studied and steps taken where necessary to provide and maintain a good power supply.



PORTABLE CRUSHER, mounted on skids, is moved with shovel to permit one-step loading of . . .

Strip Coal Crushed in Pit

New Portable Crusher at Blythe Bros. Mountain-Top Stripping Discharges Directly Into Trucks for Haul to Railroad Ramp—One-Step Loading and Crushing Eliminates Trucking to Crushing Plant and Additional Rehandling

CRUSHING AND LOADING of strip coal in one operation, thus eliminating haulage to a tipple and subsequent rehandling there, now is being accomplished with a new portable crusher at the mountain-top stripping of Blythe Bros. Co. on the old Booth-Bowen property not far from Bramwell, W. Va. Without the new crusher in operation, coal from this pit ordinarily would be hauled by truck to a crushing plant some distance away, from which it would be loaded into railroad cars.

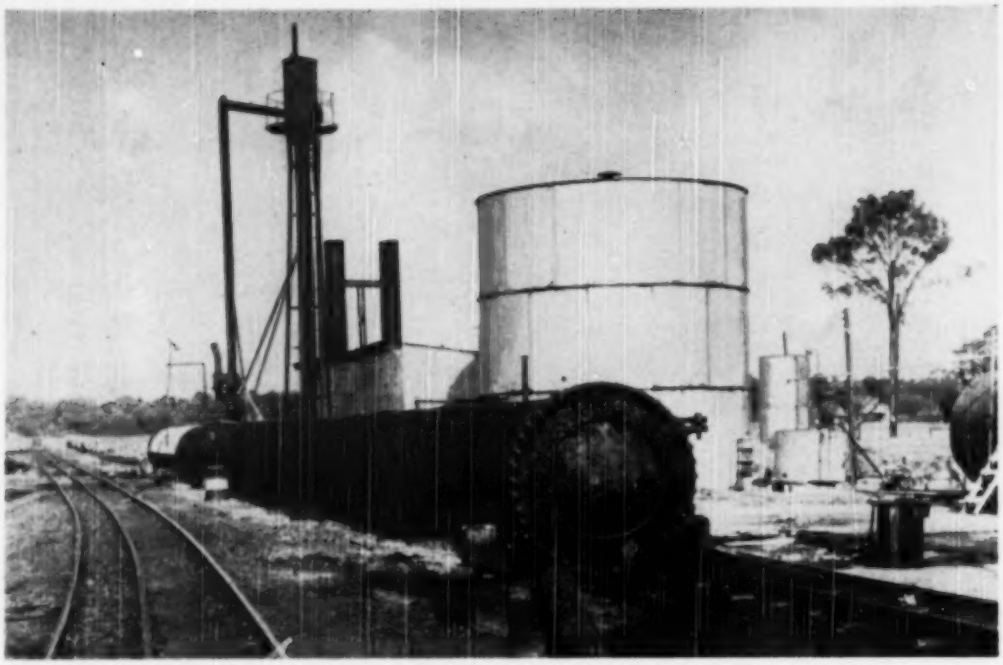
The portable crushing plant, manufactured by the Bonded Machine Works, is a double-roll unit producing 1¼x0 nut and slack for metallurgical use. The structure is mounted on metal skids and is pulled ahead by the power shovel as it moves forward. An International Harvester U4 31-hp gasoline-driven engine powers the crusher.

Daily output at this Blythe Bros. operation is 350 tons of Pocahontas No. 6 coal. The seam ranges from 30 to 42 in and the overburden is 40 ft thick. Coal loaded into the trucks is hauled directly to a loading ramp on the N. & W. at Freeman, W. Va., nearby.

Blythe Bros. Co. operates five other strip pits in the Pocahontas field and has an office in Bluefield. Other properties in the area are located at Mill Creek, Jenkinjones, Amonate, Coopers and Virginia B, the former, at one time, producing 46 railroad cars a day. Primarily a road-contracting organization, with headquarters at Charlotte, N. C., Blythe Bros. has had a large-scale strip operation in Fayette County, W. Va., for five years.

One of the Blythe brothers, Joseph L., was a state senator in North Carolina and treasurer of the Democratic National Committee when he died last March. His brother, F. J. Blythe, who now heads the company, was named to fill his term in the state senate.

Vice president of the company is W. J. Stribling, a Clemson College engineering graduate who spends most of his time in Bluefield. Leonard West is general superintendent for the company. At the Booth-Bowen operation, Terrill Lane is superintendent and Marvin A. Tabor has the haulage contract.



PRESSURE TREATING in commercial plants such as this is recommended for best results in protecting heavy timber, particularly for use underground. The treating cylinder, holding two cars of timber is in the foreground.

More Life From Wood

Longer Service, Greater Safety and Cost Reduction Are Major Wood-Treating Benefits—Preservatives With Maximum Desirable Characteristics Include Pentachorophenol—What Penta Is, What It Does and How It Is Used

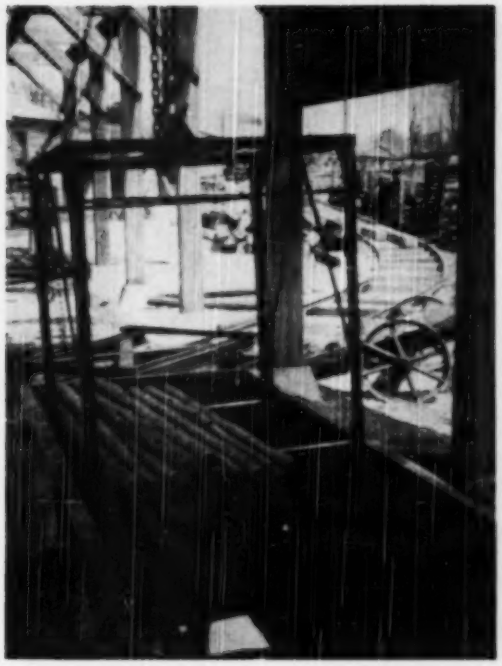
By JOHN C. HAMMOND
The Dow Chemical Co., Midland, Mich.

THE VALUE of preservatives in cutting costs and promoting safety through lengthening the life of wood products has been proved by many years of experience. That experience also has shown that in addition to the vital factor of ability to prevent decay and insect attack the preservative should provide the lowest possible treating cost consequent with maximum timber life, and should leave the wood so that: (a) men can handle or be around it with a minimum risk of skin or other injury, and (b) there will be a minimum of disagreeable, toxic or inflammable vapors or fumes. Among the preservatives providing the maximum of these desirable qualities is pentacholorophenol, commonly called "penta," which is coming into increasing use.

What Penta Is and What It Offers—Penta is a dry brownish-gray crystal. It is dissolved in petroleum oils of specific characteristics for various uses. Penta-treated wood resists both rot and insect attack, and its uses range from furniture, millwork and building lumber through fence posts, poles, crossarms, ties, mine timbers, bridge timbers, wagon beds, stock-car siding and boats to templates, patterns and shoemaking lasts. In 1947, according to the proceedings of the American Wood Preservers' Association, 6,909,146 lb of penta crystals was used, exclusive of solvents.

Penta crystals are not soluble in water to any appreciable degree. They have a vapor pressure low enough to make them stable for long periods of time once in the wood. Tests have been conducted in climates and soils selected for their abilities to destroy wood, where fungi thrive like new geraniums and where termites destroy untreated southern pine test stakes in a matter of months. The Forest Products Laboratory, Forest Service, Dept. of Agriculture, reports no destruction at their test plots in 12 years of exposure.

Tie use by a number of railroads goes back 10 years or more. While it takes 50 years or more to obtain



HOT-AND-COLD TREATMENT (left) and cold-soaking (right) are alternatives when commercial treating is not available. In using these processes, care must be exercised to match treatment to wood for desired results.

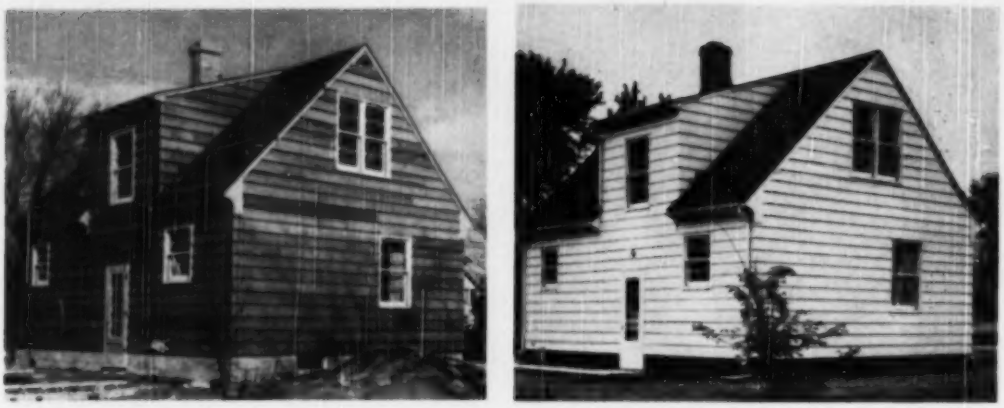
complete service data, the engineers of these railroads report all the ties standing up and showing no signs of decay. Many utilities are specifying full-length treated poles and crossarms. This full-length treatment is gaining favor because the poles are protected against "shell rot" and at the same time are clean and easy to handle.

Cleanliness and ease of handling result from the fact that the wood is dry and free of oily residue. A slight petroleum odor—no worse than that of lubricating oil—remains only a few weeks after treatment and then disappears. When wood is treated with penta in a high-flash oil, it does not ignite any more readily than does ordinary untreated wood.

DIPPING TO PROTECT MILLWORK in a galvanized tank reinforced with lumber and supplemented by a drainboard next to the wall.

Treating Costs and Treating Methods—Treating costs with penta are competitive with AWPA Grade 1 creosote. Since treatment of heavy ties and timbers, particularly those for use underground, require impregnation with 6 to 8 lb of preservative per cubic foot, pressure treatment by a commercial plant is recommended for best results. Dow Chemical will gladly supply a list. Where the user is not close to a commercial plant, he can treat himself in a hot-and-cold bath. Cold soaking is another process, while brushing or spraying may be employed in treating millwork and building lumber.

At a commercial treating plant, peeled and seasoned timber is placed on buggies and rolled into pressure cylinders. From that point, procedure depends upon the type of treatment, which in turn depends



PROTECTION AGAINST DECAY. Insect attack, dimensional changes and paint blistering was achieved in this house, shown before and after painting, by treating siding, cornice and trim with water-repellent preservative, which also cut paint for the priming coat 30%

on the kind of wood to be treated.

The process is based on driving the preservative into the wood by pressure. The idea is to get the crystals into the wood and keep them there. When the crystals are in the wood, the mycelium (roots) of fungi shrivel up and termites go moaning home with an awful pain the belly. Certainly, they don't come back for more.

Hot-and-Cold Treating — With the hot-and-cold bath—one of the alternatives where the user is not conveniently near a commercial pressure-treater—good results can be obtained at an economical cost if time is taken to determine the treating characteristics of the wood and, consequently, the quantity of crystals needed per cubic foot. Help in these matters can be obtained from regional foresters.

Equipment for the hot-and-cold process consists simply of a steel tank with steam coils for heating the oil, and a second tank for dunking the timbers to cool them off after they have been soaked in the hot oil. On occasion, one tank with pipe and fittings to change the oil bath from hot to cold is used. A hoist, shelter to keep out the rain and a rack and draining apron to catch the drippings after the treatment are the major auxiliaries. In cooling in the cold bath a partial vacuum is created in the wood, which is said to result in deeper penetration of the crystals of penta in the oil.

Treating may be done with a concentrate of penta mixed with one part concentrate to 10 parts of fuel oil, kerosene or other petroleum oil of the same or slightly higher viscosity. Satisfactory treating solutions have been made by mixing used, filtered crankcase drainings with an equal volume of fuel oil or diesel oil and then adding the penta concentrate. This provides users of internal-combustion-engine equipment with a new outlet for waste crankcase oil.

Treating by Cold Soaking—Cold soaking is used extensively in penta-impregnation of farm fence posts (Tables I and II, "Stop Fence-Post Rot," The Dow Chemical Co., Midland, Mich.). Like the hot-and-cold bath, it is not advised for mine timbers when pressure treatment is available. As the name implies, the process simply involves soaking a batch of timbers in a cold solution of 5% penta-in-oil long enough to get the crystals into the wood. Since there is a wide variation in absorption rates and quantities retained, care should be taken to get competent instruction before attempting to treat mine timbers by the cold method. The process is not difficult, but to get good results it is necessary to know what can be expected and how to go about getting it.

Opportunities in Buildings and Houses—Real opportunities for economies also exist in using treated wood in the construction of mine buildings and employee housing. Penta solutions have been developed by the Western Pine Association for use by millwork manufacturers. Most lumber dealers can supply this product for either brush or spray application if they do not have lumber and millwork already treated. This type of penta is water-repellent under storm conditions encountered in most climates and will greatly reduce dimensional changes in frame structures, sash, doors, bureau drawers and other cabinet work. It keeps the siding and roofing boards from opening up and, consequently, keeps dirt and cold out and warmth in.

With this penta compound, excellent protection can be obtained simply by dipping lumber and millwork in a tank (galvanized sheet reinforced by lumber serves nicely) for 3 to 5 min for use above ground, either interior or exterior. For wood below ground, or in contact with the ground or damp masonry, the time should be 1 to 2 hr.

Usually, treating frame houses adds only 1 to 2% to the total cost. Per thousand board feet, the cost in most urban areas is $20 to $25. This may sound high until it is compared to the savings in painting and maintenance. Water-repellent preservative provides a very satisfactory priming coat for new lumber purchased ready-treated, resulting in an initial saving in paint and labor. Then, there are further savings in reduced deterioration, meaning that the house or building stays in better shape.

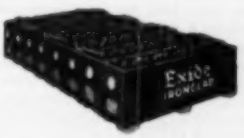
Many large lumber dealers are also millwork manufacturers and have treating facilities. Tell them to dip-treat not only millwork but housing and building lumber in water-repellent preservative. If they don't know what you are talking about, refer them to Technical Bulletin 6, Western Pine Association, Portland, Ore. Tell them you want the same thing the National Door Manufacturers' Association has adopted for treating millwork.

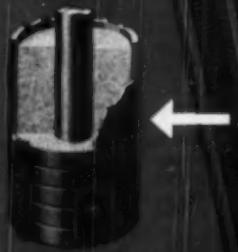
EXIDE-IRONCLAD PLATES *are DIFFERENT*

The famous and exclusive Exide-Ironclad positive plate is the result of sixty-two years of battery-building experience. During that time we have learned much about the design and construction of every type of battery for every application. Development work never ceases in improving the performance of Exide-Ironclad Batteries. Our research staff is the largest in the industry. Engineers, chemists, metallurgists, physicists, technicians and their aides, equipped with all the necessary tools and devices, are constantly building and testing various types and kinds of plates and assemblies.

We have yet to find a positive plate with all the desirable characteristics of the Exide-Ironclad for use in mine locomotives, trammers and shuttle cars. Further proof of its superiority is supplied by long service records in thousands upon thousands of installations.

Exide-Ironclad Batteries provide high power ability, high electrical efficiency, ruggedness, long life, minimum maintenance. The combination of these Exide-Ironclad characteristics assures years of dependable day-in, day-out service . . . *at lowest cost.*





Submerged extremity view of section of Exide-Ironclad positive plate. Its small size has been exaggerated, while permitting many ounces of electrolyte, they retard the active material from readily crumbling out of grid openings.

THE ELECTRIC STORAGE BATTERY CO.
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"Exide-Ironclad" *Reg. Trade-mark U.S. Pat. Off.*

CREW EFFICIENCY AND MORALE are raised, waste and grumbling are eliminated when you . . .

Look Around You for "The Best Things In Life"

"THE BEST THINGS in life are free" is an old saying that everyone understands. However, human nature and preoccupation with other matters sometimes prohibit us from accepting these gifts or from even realizing that they exist. They must be "sold" to us before we can appreciate them. The price we pay is not measured in dollars and cents, but in the little bit of mental effort we must put out to finally accept these "best things in life."

Let's pin down this high-flying start, now, with the application of the "selling" mentioned above to the mine supervisor's job. Some of the benefits that could be described as the best things in life around a mine section are actually free. They are: (1) a complete understanding by every employee of the company's mission, (2) the willingness to cooperate on all levels, (3) a genuine interest in safety among all employees, (4) efficient use and conservation of equipment and supplies, and (5) good workmanship on every job.

If these five factors were in evidence throughout any one section, the work of that section-boss would be half done. A production group becomes a team only when it exhibits these basic characteristics of a smooth-working organization. A large part of a supervisor's job is selling these gifts to the men in his section. Normally the men won't give them a thought because their minds are occupied with other matters.

Some hints for attaining the desired goals are:

Understanding the Company

1. **Developing in every employee an understanding of the company's mission**—Under present conditions any suggestion that the company deserves a break often will be met by a blank stare, but this would be a more favorable reaction than open opposition, which is also a possibility. Is there some other way to make the approach, then? How about letting the man know where the coal he produces is sold and used? Give him an insight into the quality features a customer expects in the coal he buys. The company's mission, after all, is only to make a salable product from the raw material produced in the mine. The cost of converting raw material to a marketable product depends in great measure on the condition of the raw material, and the miner has some control over this.

You are asking him to produce something which someone else must want to buy, and since he is in the market every day for his own needs he should understand the search for quality at reasonable cost. This approach, of course, demands that you have a complete knowledge of the company's coal and the market for it.

Developing Cooperation

2. **Developing the spirit of cooperation**—The most universal alibi for poor performance in mining is the mythical stubbornness and downright cussedness of the "cross-shift." They haven't done anything right since they started to work in the place—or so the story goes. And isn't it true that they feel the same way about your honest efforts?

Sometime in the past—everyone forgets the details now—there may have been some occurrence that caused this friction between cross-shifts, with more or less justification. But is there any point in keeping the gears clashing now? Someone is going to be required to make the first move toward better relations, and it

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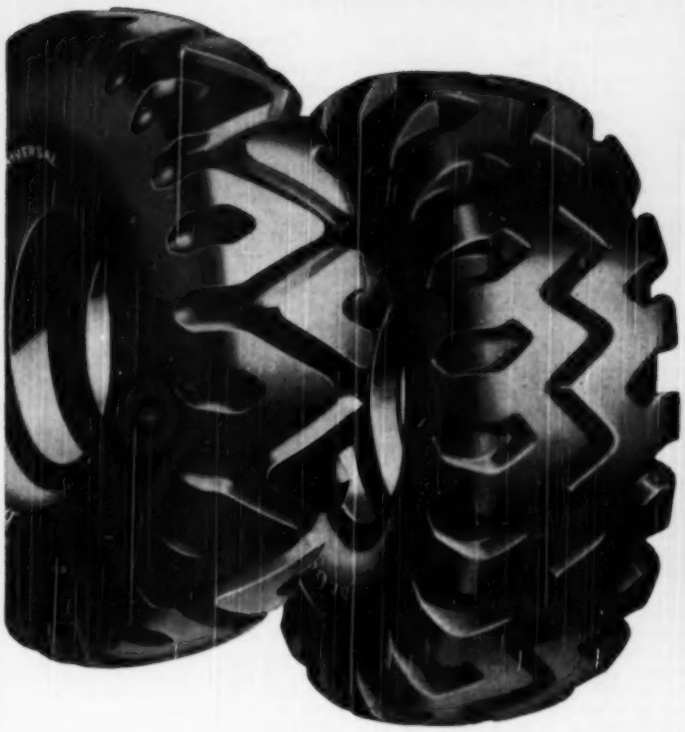

Universal all-nylon for jobs where traction is problem. Note 2-way tread, bulky wedge-shaped cleats.

These *Rock Logger all-nylons* were on a truck in extremely tough service for 2 years . . . are still going strong!

ALL-NYLON

tires give full service with no bruise or flex failures

THE B. F. Goodrich ALL-NYLON tire is now in use—and proving successful—in mining operations throughout the country. The record speaks for itself: *no blowouts, no bruise breaks, no flex breaks* . . . and that includes severe operating conditions in mines where flex and bruise failures formerly were common. Now, all-nylon tires are giving mine operators full service with no bruise or flex breaks.

Along with nylon, B. F. Goodrich uses weftless construction. This means there are no cross-threads to hamper cord action and allow some cords to stretch out. Therefore, tire growth is reduced; tires last longer.

Nylon tires always provide big savings for strip-mining, quarry and other operations where heavy loads and rough terrain have made tire costs high.

The new, all-nylon construction is typical of the continuous improvements being made in truck tires by B. F. Goodrich. Long ago, BFG engineers developed special types of tires for mining service. They constantly developed new improvements. One of these was the nylon shock shield, a major construction advancement now used in all B. F. Goodrich truck tires with 8 or more plies (double nylon shock shield in large, off-the-road tires).

For more information on the way B. F. Goodrich tires can do more work and save you money, see your BFG dealer or write us direct. *The B. F. Goodrich Company, Akron, Ohio.*

New Year – New Opportunity

DESIGNERS of our calendars deserve commendation for giving us a chance to make a fresh start periodically. Each new year presents us with an opportunity to correct bad habits and to put new knowledge to work so that it can be evaluated over a definite period of time. This early part of the year is usually the time for an inventory of the accomplishments we have made, or the goals we have missed, in the past year. Another attempt to gain these goals in the new year requires resolution to do a better job. And there is that word —resolution.

There is a basic difference between a resolution to increase mine safety, and the usual new year resolution. For example, most new year resolutions are made in a spirit of fun, and no damage is done if you break them. On the other hand, a doctor may tell you that further indulgence in some bad habit will injure your health. Now this is it—this is necessity, and you resolve to break the habit and you keep the resolution. Decisions to promote mine safety are just that urgent. A current safety slogan defines the issue: "The life you save may be **your own.**"

Final reports for 1949 probably will show that falls of roof and coal and haulage accidents caused the most injuries and fatalities in the coal industry. These hazards would seem to provide the major area for improvement, giving other hazards due consideration, of course.

An anthracite mine official recently completed 20 years' service in responsible operating positions without a lost-time injury resulting from roof-fall to any man under his supervision. Luck was not involved here. The secret was strict day-to-day supervision, and constant resolution to control the roof and thereby limit accidents from this cause to an irreducible minimum. All good foremen should be able to approach this condition through self-discipline and supervisory roof-control.

Test the roof and know how your roof sounds when it is solid or loose. Direct the men to test the roof and to trim loose rock and coal. Check the outby roof and ribs at frequent intervals. They may hold more potential danger than the face area. Be roof-conscious.

Haulage is also a source of numerous accidents and injuries. Note that there is a difference between accidents and injuries. Too often we admit accidents only when someone is injured, but any unusual occurrence which might have injured someone is an accident. Accident-prevention consists of removing these occurrences from the mining operation. Though easier said than done, here are some aids you have at your command to help with the job: Keep the track and roadbed in the best possible condition. Maintain track clearances for the safety of haulage employees and others. Check rolling stock for defective wheels and couplings as a matter of habit. Be sure that rerailers, jacks and coupling hooks are used when conditions warrant. Investigate your haulage pattern in an effort to relieve jamming and the resulting hurry when jams are cleared. Above all, prohibit "cowboy" operation of the equipment. A thrill-seeker doesn't belong in the cab of a locomotive or shuttle car.

Now is the time for planning your safety promotion, and this is the last chance you will have to make a fresh start this year.

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will be to your credit if you act first. Remember, the man with more sense is more to blame for a stalemated argument, so make your move to foster better cooperation. Your men will profit by the example you set, and it involves only the willingness to extend the benefit of a doubt to others.

Promoting Safety

3. Generating a genuine interest in safety among all employees—This is a minute-by-minute job for the foreman. Safety consciousness must pervade all your thinking and planning for the team's performance. To transfer this mental attitude to the men is the problem. It can be done only through sincere and frank discussions of the subject.

When you decide to have a job done a certain way in the interest of safety, be sure the miner knows the reason for your asking that it be done that way. There may be an easier but more dangerous way to do it, and human exertion, like electricity, follows the path of least resistance. You can tell him to produce more without sounding like Simon Legree, if you also tell him to do it safely. He will appreciate your concern for him. A word on safety, as he reports in the morning, puts his well-being on his mind before he begins to work. "Take care of yourselves" make a good parting word when you leave a room after your regular inspection visit. Put yourself in the place of the man who receives such reminders. They would make you think, too.

Don't bet on the length of his mining experience to keep him out of accident trouble. Records show that "old" employees and "new" employees suffer most accidents. Those of average experience seem to have learned good habits and have not yet become careless. Your job will be to remind the old employee and teach the new employee.

Conserving Equipment

4. Stimulating efficient use and conservation of equipment—Every opportunity to use machines and tools in preference to manpower is being seized because of the high cost of labor. To realize the savings resulting from the introduction of machines it is necessary to use them wisely and to keep them operating at rated capacity on their designated functions for as great a portion of shift-time as possible.

Given proper incentives, a group of men will try to get the best out of a machine. Grumbling and half-hearted effort may result when they do not understand the purpose and operation of the machine. You can't assume that they know these things—you must tell them.

When they accept the equipment and are really trying to make it work you may notice that they forget a lot of little things. Shaker-conveyor chute bolts, for example, are not big when compared with a full conveyor installation. However, when they are lost or damaged in any number their cost amounts to a sizable item. If dollar bills were thrown into the gob or conveyor line, instead of the bolts that find their way there, there would be less room taken up in the gob and less damage to tipple equipment, and the monetary loss would not be any greater.

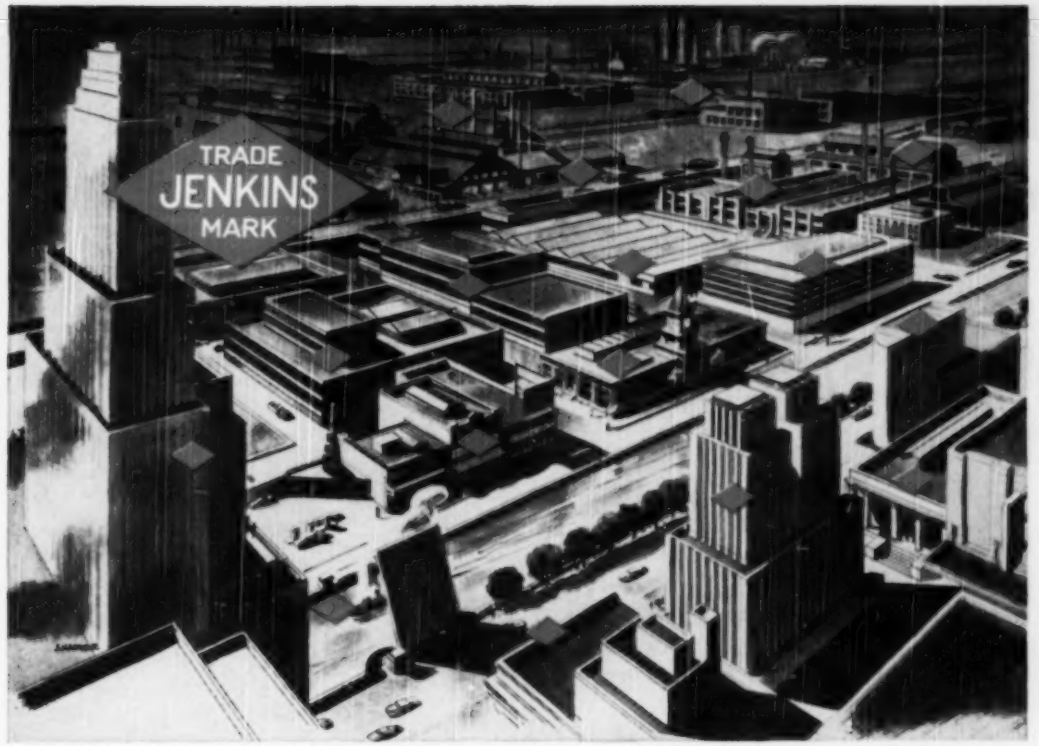
Keep an eye on the little things. A garbage can full of things that didn't belong there has put more than one lunchroom out of business.

Getting Good Workmanship

5. Achieving good workmanship on every job—If a task is done right the first time, it won't have to be done again, and it will be a safer job. The attainment of this goal depends almost entirely on your instruction and example. The men will be watching whenever you handle a tool, or perform a roof or gas test. Be sure that you do it correctly. Be a "do as I do" man.

When you help a man do a piece of work by suggestion or instruction, you help him to feel the satisfaction anyone derives from a well-done job. When he completes the task, a pat on the back from you will insure its being done the same way next time.

In the foregoing discussion there is no hint of an earth-shaking new discovery in labor relations. The emphasis is placed on keeping the little things in mind in all phases of operation. They do so much good, but are so easy to overlook or forget.



Acres of Diamonds

YOU SEE only the structures of commerce, soaring skyward . . . the strange new shapes of industry stretching beyond. Yet all around you are acres of diamonds. Diamonds that identify the thousands of Jenkins Valves on duty in the many different types of buildings essential to modern civilization.

Nothing holds its value like the diamond, in valves as in gems. Four generations of American builders have placed their trust in the Jenkins diamond and signature trade mark. Today, as in 1864, Jenkins Valves are the choice of men who plan shrewdly, always with an eye to future maintenance and operating costs.

They know that Jenkins builds extra endurance into Valves — proved by long life and low upkeep cost records in every type of service. They know, too, that there is extra value in the *experience* Jenkins Valve specialists can apply to any question of selection, installation, or maintenance.

You pay no more for Jenkins Valves, despite their superior quality and service. So why not let the Jenkins diamond serve as your guide to valve economy . . . for new installations, for all replacements. *Sold through leading Industrial Distributors everywhere.*

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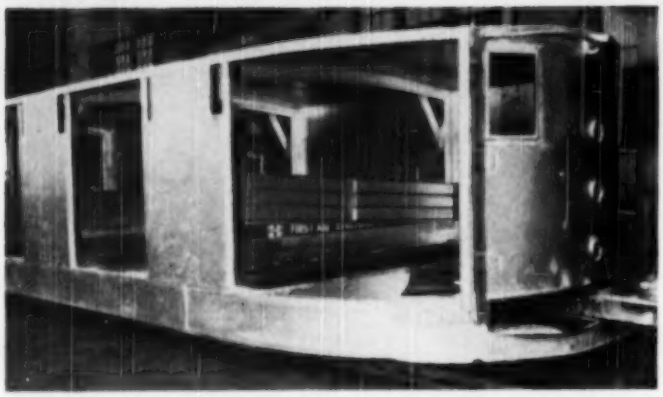
Operating Ideas



NEWLY DESIGNED MAN-TRIP CARS at Jones & Laughlin mines can be quickly transformed into ambulances and are equipped with special steel-encased first-aid outfits.

Man-Trip Cars Readily Converted to Ambulances

NEW MAN-TRIP CARS in use at Vesta Nos. 4 and 5 and Shannopin mines, Jones & Laughlin Steel Corp., have been redesigned and equipped with special first-aid outfits to permit each car to be easily turned into an ambulance. Design changes featured in the cars include enlargement of the front door to admit a stretcher with a patient, making two of the back seats removable to provide space for the stretcher, use of 8-wheel trucks for smoother riding and enclosure of the front for wind protection.

A complete first-aid outfit, including blankets, splints, folding stretcher and other emergency gear, is contained in a steel box located behind the front set. The first-aid outfit was developed by Mine Safety Appliances Co., Pittsburgh, Pa.

One advantage of the kit is the sturdy steel case that has an extra-heavy tight-fitting lid and rubber gasket to keep the contents dry and free of dust and mildew. In addition, most of the articles in the case also are protected by being encased in plastic bags or all-weather-type containers. The steel case is 56 in long, 12⅝ in wide and 8 in deep.

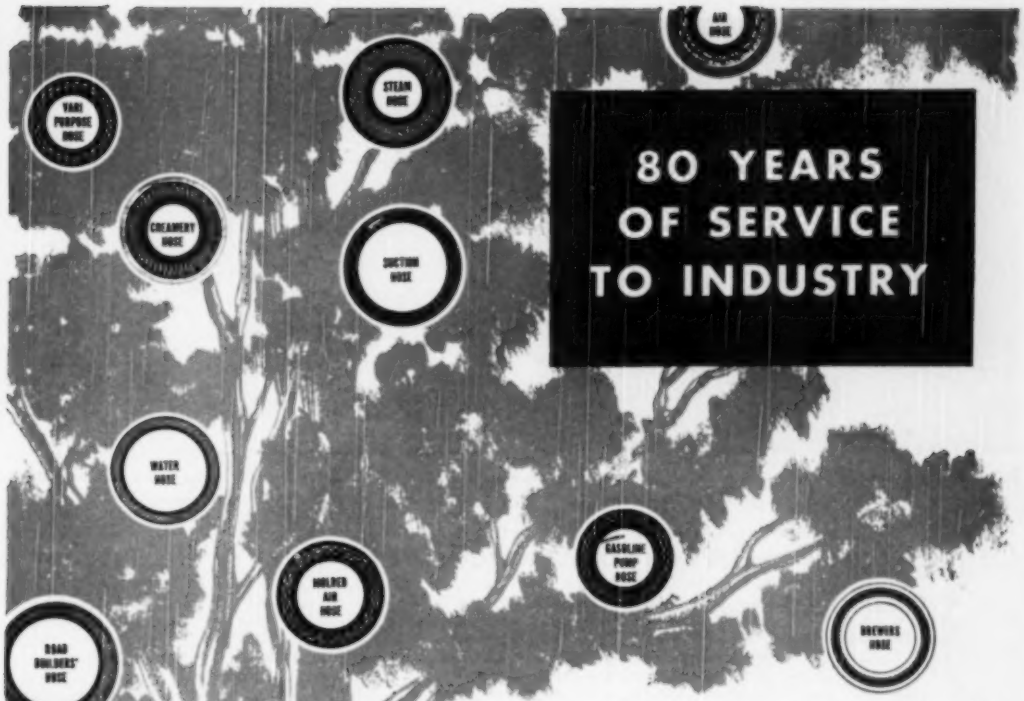
Because the man-trip cars are parked in breakthroughs near the working faces during each shift, they are readily available in an emergency, both to transport patients and to provide a greater quantity of first-aid supplies to supplement the standard first-aid equipment that is regularly kept in each section.

HAULAGEWAY MODERNIZATION includes this new 85-lb limestone-ballasted track that replaced a section of 25-lb steel.

Modernization Includes 2 Mi of New 85-lb Track

RECOGNIZING that transportation is the very heart of coal production, officials of the Trotter Coal Co., operating in Monongalia County, West Virginia, made plans during the latter part of the war to modernize the haulage in their Bunker mine, which is an old operation, just as soon as materials became more plentiful. Following enlargement of the car-hoisting slope and installation of an underground rotary dump and slope belt conveyor (p. 86), work was begun on the 2-mi main haulageway.

The modernization program, which now has been completed for about ½ mi, consists of replacement of the old 60-lb and 25-lb rail of the 42-in-gage track with 85-lb steel set on 5x7-in by 6-ft creosoted ties. Laid with precision alignment and ballasted with 6-in of crushed limestone, the new track provides a high-speed trouble-free road for the trips of 8-wheeled mine cars each carrying 8½ tons of machine-loaded coal. Bunker mine operates two shifts and has a daily production of 4,000 tons of cleaned coal.



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It was in 1870 that rubber goods were first made in the present Hamilton plant; 80 long years ago during which time, year in and year out, Hamilton has consistently supplied industry with a complete line of top quality rubber products.

Now, in 1950, Hamilton offers you the crop it has harvested for 80 years—EXPERIENCE. Experience means "Know How", and "Know How" means products that will operate better at lower costs—our contribution to you.

Since its beginning, Hamilton has enjoyed the patronage of a wide segment of industry. For this we are proud, and because of this, we are able to celebrate our 80th Anniversary.

WHATEVER MAY BE YOUR REQUIREMENTS FOR BELTING, PACKING, AND HOSE, HAMILTON HAS THE PROPER TYPE. LET OUR EXPERIENCE WORK FOR YOU AND PERMIT US TO SERVE YOU WITH OUR INDUSTRIAL RUBBER GOODS.

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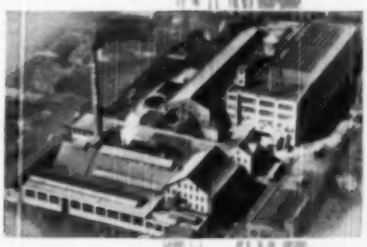

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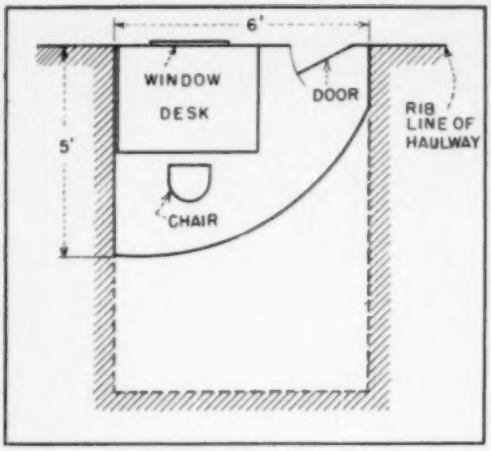
TRENTON 3, NEW JERSEY

CONVEYOR BELTING



NO LONGER DISTRACTED by numerous visitors, William Branighan, dispatcher, is shown in his "two-by-four" office, which was obtained by installation of a curved partition (curved line in drawing) that reduced the original space to a minimum.

Office Shrunk to Prevent Distractions at Request of Dispatcher

FEW PEOPLE ask for a smaller office, but that is what William Branighan, dispatcher, did at Bunker mine, Trotter Coal Co., Cassville, W. Va. The office is located inside the mine on the main haulageway near a junction point where men sometimes congregated or stopped en route. Mr. Branighan faced the problem of trying to keep his mind on dispatching and understand the telephone when several men were standing in his office talking. He hesitated to tell them to get out and found it impractical to lock everyone out, including the foreman.

At his request, mine officials put a curved partition in the office, reducing its size to the small dimensions indicated by the heavy lines on the drawing above. Now, there is standing room only for one or two men at the most, and they are cramped at that. While the office is not large, it serves its purpose very well.

Filter Box Eliminates Water Sprays Clogging

A FILTER BOX that prevents clogging of the water sprays serving the dewatering and desanding screen receiving washed coal from a Chance cone has proved most effective in eliminating the regular cleaning of the sprays formerly required at the Dorrance colliery, West Virginia Coal & Coke Corp., Stirratt, W. Va.

Before the filter was installed, the water sprays had to be cleaned out about every 2 hr and during the time they were out of service an inefficient job of desanding the washed coal occurred. As a result, there was extra wear on the conveyors and elevators and the coal had a higher ash content, in addition to the loss of the high-grade sand used in the cone.

The water supply for the sprays passes from right to left through the filter box, which is shown in the accompanying illustration with its originators, Herb Green (left) and Harry Hatfield. When the water strikes a screen, located behind the mark to which Mr. Green is pointing, the oversize material that ordinarily stops up the sprays drops to the bottom of the trap. A valve in the bottom of the trap permits flushing it out occasionally. If that fails to clear the screen, the water may be by-passed to the back of the screen by opening a valve in the by-pass line above the filter box, closing the intake valve at the right and opening the valve in the bottom of the trap.

CLEANING OUT of water sprays every 2 hr is no longer necessary when the water supply passes through this filter box installed over the dewatering and desanding screen receiving cone-washed coal at Dorrance colliery.

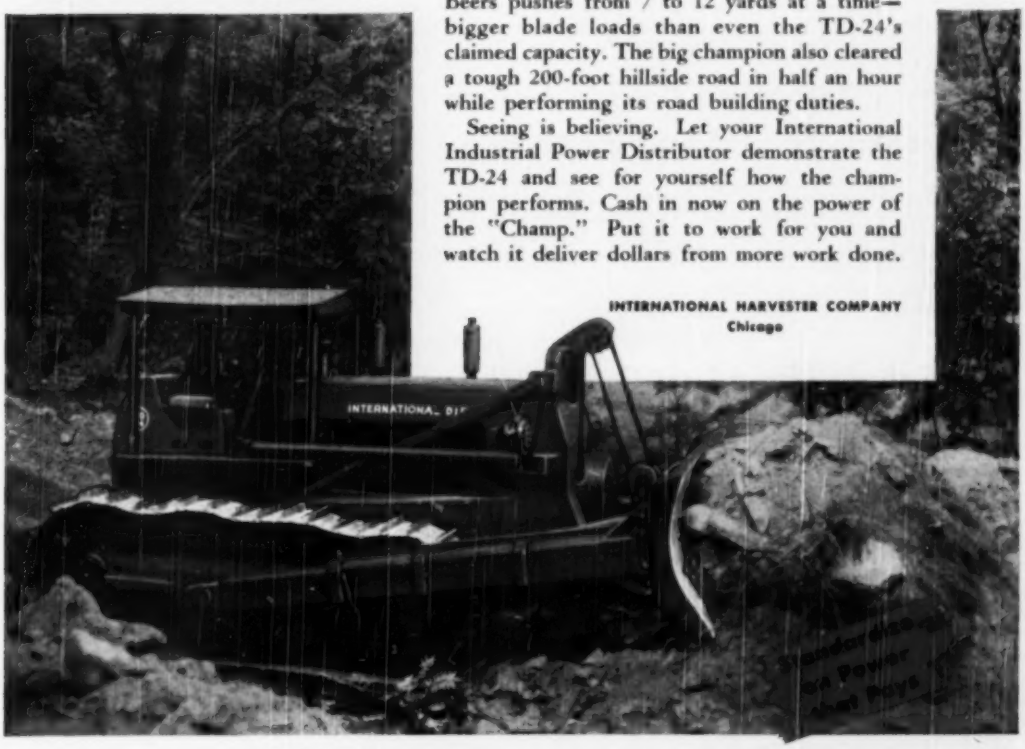
Champion OF 'EM ALL!

When the International TD-24 climbs into the production ring, its power plus features found in no other crawler, pay off in dollars. The champion packs the winning punch when the going is toughest.

J. H. Beers of Bangor, Pa., found that his TD-24 does the work of two competitive big tractors. This TD-24 works with a big shovel in strip mining operations and according to Beers pushes from 7 to 12 yards at a time—bigger blade loads than even the TD-24's claimed capacity. The big champion also cleared a tough 200-foot hillside road in half an hour while performing its road building duties.

Seeing is believing. Let your International Industrial Power Distributor demonstrate the TD-24 and see for yourself how the champion performs. Cash in now on the power of the "Champ." Put it to work for you and watch it deliver dollars from more work done.

INTERNATIONAL HARVESTER COMPANY
Chicago



CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

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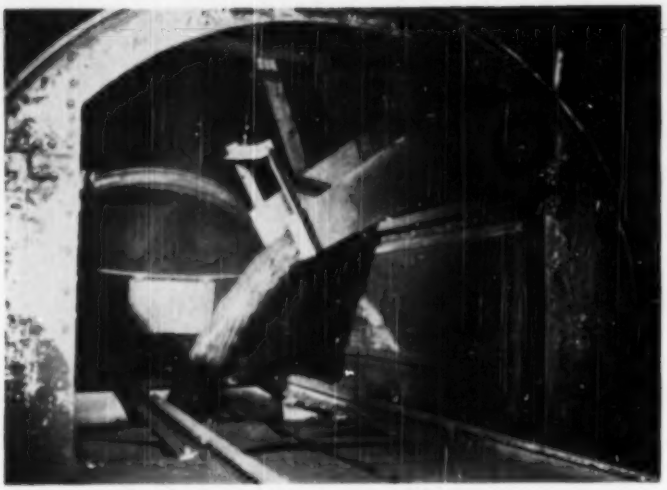

COAL DISCHARGED by the slope belt flows through the movable chute and old rotary dump into the tipple surge bin. The metal paddle at the far end of the dump operates a mercury switch to stop the belt and signal the underground dump when the coal fills the bin and overflows into the dump. In case of breakdown, car hoisting by the old rope haulage can be resumed within a few minutes.

New Belt Slope Guards Against Breakdown and Surface Overflow

RESUMPTION of car hoisting in a relatively short time in case of difficulty with the belt or underground dumping equipment is a feature of the changeover from rope haulage to a belt conveyor on the main slope of the Bunker mine, Trotter Coal Co., Cassville, Monongalia County, W. Va. A mercury switch that automatically stops the belt and signals the underground dumper when the tipple bin overflows is another safeguard.

The Differential 8-wheeled mine cars carrying 8½ tons of coal, machine-loaded, formerly were hoisted in trips of one on a single-track slope and overturned in the tipple by a Differential rotary dump. Work of enlarging the slope to accommodate a belt conveyor 42 in wide and 300 ft long (centers) was done without interfering with production. A duplicate rotary dump was installed underground and the belt was arranged to discharge in the tipple to a movable chute that directs the coal through the old dump to the existing 70-ton tipple surge bin.

The end of the movable chute is counterweighted so that it may be raised to clear the rotary dump. A mercury switch, installed in the old dump by C. A. Campbell, master mechanic, automatically stops the belt and extinguishes a signal light at the underground dumper's station when the 70-ton tipple bin becomes filled and overflows into the dump. The switch is activated by a metal paddle on a rod extending across above the track in the lower end of the dump. The operator on the bottom must restart the belt conveyor at a definite interval after the signal relights and indicates that the rotary dump has been cleared of coal.

The slope belt was put into use Oct. 4, 1948, and since that date the arrangement for emergency resumption of car hoisting has come in handy. On one occasion, when a coupling between the speed reducer and conveyor head pulley broke, hoisting of coal on the track was under way within a half hour. The changeover was made by raising the chute at the upper rotary dump, removing the mercury-switch paddle and rod, assigning a man to operate the hoist and sending the underground dump operator to the tipple dump station.

Oil Barrels Make Low-Cost Tool Boxes

OIL BARRELS, a few hinges, hasps and padlocks were all the materials required to make underground tool lockers at Bunker mine of the Trotter Coal Co., Cassville, W. Va. The head is cut out of the barrel and then reattached by hinges and hasps welded on. As a rule, the barrel-type tool lockers are stood on end on the mine bottom. In other instances, they are set horizontally up from the floor on blocks or cross-pieces nailed to posts.

Two of the lockers are supplied for each section, one for the day crew and the other for the night crew. Wiremen keep their tools in the same type of lockers. For storing long saws, shovels or other tools with handles too long for the barrel, holes are cut in the lid to permit the ends to protrude.

TOOL LOCKERS readily made from oil barrels have a hinged lid and hasp so that they can be locked.

It's Never Too Late!

A GOOD IDEA can always help someone—so don't figure it's too late to send us that operating, electrical, maintenance or safety idea that you successfully put to work. In fact, send us as many as you can. COAL AGE will gladly pay you $5 or more for each acceptable one, on publication. Just write them in your own words—we'll edit them if necessary. Address: The Editor, COAL AGE, 330 W. 42nd St., New York 18.

No Twist— No Stress— No Strain

with

Mack Six-Wheelers

That's because only Mack six-wheelers have the advantage of Mack's famed Balanced Bogie. Here's an outstanding development that means unmatched flexibility . . . mastery of the toughest terrain without stress or strain.

The exceptional flexibility of the Mack Balanced Bogie insures equal traction, even tire loading and uniform braking on all four wheels. Exclusive Mack Power Divider assures traction at all times, regardless of terrain.

Simplicity and rugged strength are typified in the functional construction of the Balanced Bogie. Maintenance requirements are reduced to a minimum. Outside of the brake system only four points on the assembly require lubrication. No place in the suspension ever needs adjustment.

For detailed information on how this and other Mack features can cut costs and increase profits on your particular job, see your nearest Mack branch or dealer.

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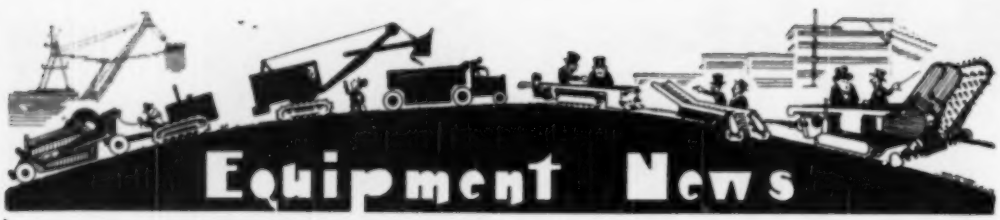
Built Like a **Mack** *Truck*

Mack Trucks, Inc., Empire State Bldg., New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



Equipment News

New Equipment for Better Mining and Preparation

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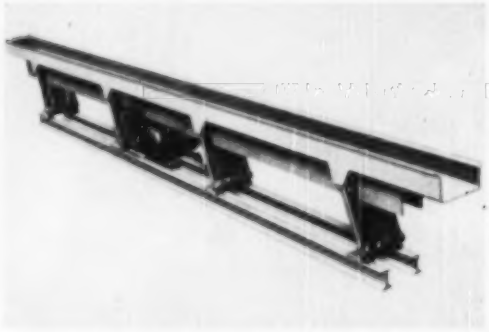
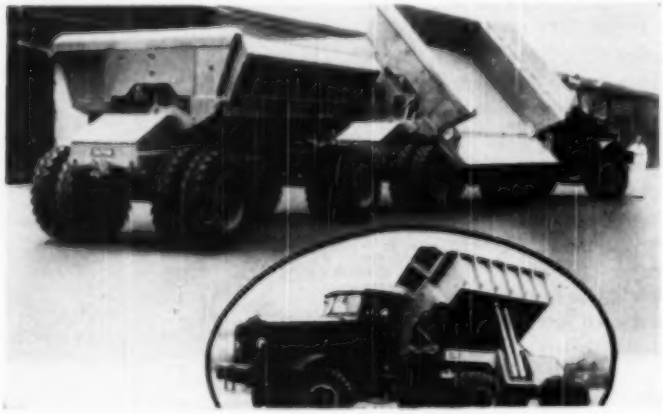


CONVEYOR—Jeffrey·MV (mechanical-vibrating) conveyor operates at positive resonance to offer large power savings with maximum conveying speeds and capacities, it is said. Vibration is isolated within the machine and design flexibility permits use of open or enclosed pans or tubular deck and floor or suspension mountings, the company says. Up to 80 ft of conveyor can be operated from one drive unit and positive conveyability results in uniform depths of material on grades up to 10 deg. Abrasive wear on decks is reduced because of the hopping action of the material. Bulletin 826 available.—*Jeffrey Mfg. Co., Columbus 16, Ohio.*

DIESEL TRUCK—Designed particularly for heavy off-the-highway hauling, the Model UD rear-dump Euclid is powered by a 125-hp diesel engine and has a payload capacity of 10 tons and a truck measure of 6.6 cu yd. Offering a top speed, loaded, of 35.7 mph, the Model UD is built to the same construction standards throughout as the larger-capacity models, according to the manufacturer, incorporating such features as the Euclid planetary-drive axle, 10-speed heavy-duty transmission, three-stage double-acting hydraulic hoist and free-floating spring mounting for front and drive axles. Bulletin 150-R1 available.—*Euclid Road Machinery Co., Cleveland 17, Ohio.*

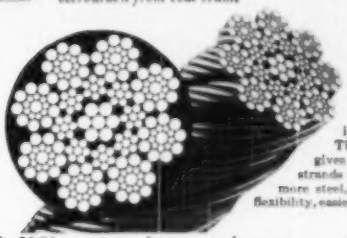


NEW 44-TON SIDE-DUMP TRAILER TRAIN combines two 22-ton semi-trailers coupled by a pneumatic-tired dolly and features patented automatic down-folding side doors on each that drop open as the body is raised for dumping. Each trailer body, which can be dumped separately, is raised by two hydraulic three-sleeve single-acting telescopic hoists operated from the driver's cab. When fully open, each door is flush with the floor of the body, thus providing a chute that sheds the load clear of the wheels. Both units are equipped with Bendix-Westinghouse air brakes and all tires are dual 18-ply 14.00:24 lug-type. The trailers are interchangeable and the rear trailer and dolly may be uncoupled for operation of the unit as a tractor and single semi-trailer The

GILLESPIE COAL COMPANY gets 30% Longer Service with J&L CenterFit Wire Rope

J&L STEEL

J&L CenterFit drag cable as seen from the fairlead sheave of a Marion 40-A dragline. The 3-yd. bucket is removing overburden from coal seam.



"CENTERFIT, an exclusive J&L wire rope, is laid together in one operation. All strands run in the same direction. Outside strands fit snugly into valleys between inside strands and eliminate crossing as in conventional designs. This prevents internal nicking—gives longer wear. Eight outside strands plus CenterFit design give more steel, less void space, greater flexibility, easier handling.

The "right wire rope for the job" pays off in longer service, reduced maintenance and greater profits.

A 30% average increase in service life! That's the performance record reported by Gillespie Coal Company when J&L CenterFit wire rope replaced a conventional dragline cable on a Marion 40-A dragline equipped with a 3-yd. bucket at its Lyons, Ind., open pit coal mine.

Average life of a conventional 6x19 dragline was 12 to 15 days; with CenterFit it was 17 to 22 days!

J&L CenterFit wire rope was selected for this application as a result of a careful analysis of operating conditions at the Lyons mine by Mr. L. S. Shaffer, J&L wire rope distributor in Brazil, Indiana. He knew the CenterFit design—exclusive with J&L—would provide the greater flexibility required for long service life on the small diameter sheaves and drums of this dragline. Actual performance records *proved* that CenterFit was *the right rope for this particular job.*

Perhaps you, too, can use J&L CenterFit wire rope to advantage. In many places it gives improved performance and longer service.

We have just issued a new handbook, *"Wire Rope Is a Machine."* This 96-page illustrated, pocket-size book is written *for the man on the job.* Tells how to select the correct wire rope . . . How to install, operate and maintain wire rope for maximum service. If you use wire rope, we'll gladly send you a copy. The coupon is for your convenience.

Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
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Please send me a free copy of your new handbook, "Wire Rope Is a Machine."

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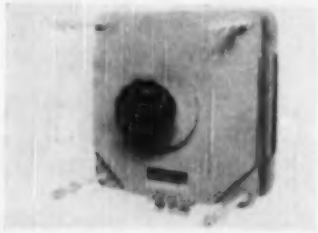
From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

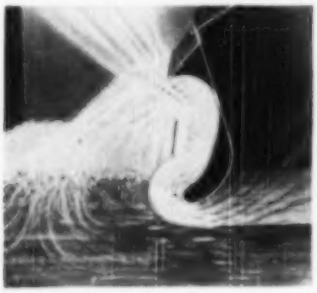
PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

entire train measures over 57 ft long and the gross vehicle weight, loaded, is estimated at 90 tons.—*Easton Car & Construction Co., Easton, Pa.*



RHEOSTAT—New plate-type rheostat is specifically designed for field control of dc shunt- or compound-wound motors, self-excited generators, exciters, separately-excited generators and synchronous meters. The unit is available in three forms: the 6-in form (27 resistance divisions); the 9-in (52 resistance divisions); and the 12-in (70 resistance divisions); and includes sequence and concentric rheostats as well as sprocket and motor mechanisms. The unit features stops adjustable through 90 deg, handwheel operating mechanisms and sequence drives, and a steel enclosure. Bulletin GEC-487 available.—*General Electric Co., Schenectady 5, N. Y.*

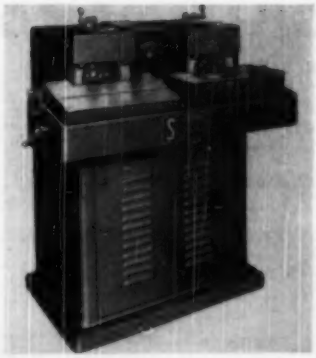
30-SEC CEMENT SETTING—Dasquick chemical added to fresh Portland cement makes a mortar that will set within 30 sec to permit stopping of water leaks up to 40-lb pressure in concrete walls without removing hydrostatic pressure, according to the manufacturer. The mortar, which reportedly can be used against free side of concrete walls, begins its initial set in 15 sec and is shaped into a putty-like plug for insertion into the hole where it is held for an additional 15 sec.—*Dasco Co., Inc., 1602 Thames St., Baltimore 31, Md.*



DUST COLLECTOR—Type N Roto-Clone, a hydrostatic precipitator that cleans the air by the combined action of centrifugal force and a thorough inter-mixing of water and dust-laden air (as illustrated), re-using the water without recirculation pumps or spray nozzles, has been redesigned to permit wider application and improved performance, according to the manufacturer. The new Design 2, with capacities through 48,000 cfm, is said to maintain a lower pressure drop with the same cleaning efficiency and water-recirculation rate and can be operated from 50 to 120% of its nominal rating without affecting its collecting efficiency. All sizes are available in either manual clean-out, sludge-ejector or hopper-bottom arrangement. Bulletin 277-A available.—*American Air Filter Co., Inc., 215 Central Ave., Louisville, Ky.*

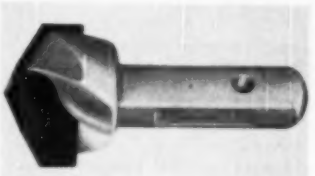
CUTTER-BIT MAINTENANCE—Designed to help educate mining-machine operators to get the most out of their equipment, a decal provided on the shank of each of the Carboloy heavy-duty carbide-tipped coal-cutter bits shows visually what the tool looks like when it becomes dull enough to require sharpening. Before the decals are worn off, the operator will have had the picture fixed in his mind and will again be reminded every time a new tool with its fresh decal is inserted, the company believes.—*Carboloy Co., Inc., Detroit 32, Mich.*

PLASTIC PIPE—Carlon "EF," a new extruded plastic pipe developed especially to handle drinking water, also can be used for gases, cold chemicals, sewage, corrosive gases, radiant-heating coils and drainage systems. Features cited by the manufacturer include light weight, flexibility, corrosion-resistance and service life much longer than that of metallic pipe. Long sections of Carlon EF can be handled easily and quickly by one man, who reportedly can lay the pipe and make joints in as little time as 2 min. A 25-ft length of 6-in pipe, for example, weighs about 55 lb, it is reported.—*Carter Products Corp., 10223 Meech Ave., Cleveland 5, Ohio.*



GRINDER—New Twin-Wheel wet- or dry-tool grinders for carbide, Stellite and high-speed steel tools permits operator to instantly switch from roughing to finishing wheel and also provides for use by either one or two operators. Designed for operator visibility and convenience, according to the manufacturer, the units feature stationary degree-graduated independent tilting tables, tilting 15 to 30 deg; reversing control switch; two removable covers for access to all parts and equipment; protractor tool guide with diamond holder; resilient tray for tools and honing stone; and built-in exhaust outlets for dry grinding. Type 10TD has a 1½-hp motor and two 10-in plate-mounted cup wheels; Type 14TD, a 3-hp motor and two 14-in plate-mounted cup wheels. Bulletin 18 available—*Standard Electrical Tool Co., 2502 Galvin St., Cincinnati 4, Ohio.*

BLASTING CAPS—New line of Western Minimax fractional-second electric blasting caps are of one-piece all-metal construction and are available in 10 periods of delay. Supplied with plastic-covered wires and plastic shunts, the new Minimax caps are ventless and waterproofed and the one-piece single-diameter shell is said by the manufacturer to simplify the making of a primer cartridge, with premature ignition or gas eliminated. The base charge of the new cap is RDX.—*Explosives Division, Olin Industries, Inc., East Alton, Ill.*



PIN-HOLE DRILL BIT features a cutting edge of solid Kennametal cemented-carbide and a shank and body of forged-steel construction. The FD bit is designed for rotary drilling of single-gage holes in hard shale, slate

Leads the way in
"heavy-density" coal cleaning

First to introduce "heavy-density" coal cleaning, the Chance Sand Flotation Process has consistently maintained leadership up through the years. Today, it is cleaning coal with better results than any other equipment.

The Chance Process is preferred by leading operators in the bituminous fields because of its high separating efficiency, dependable performance, flexibility and economy of operation.

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WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

Add a BIG *SAFETY* FACTOR to your hoist

A Laughlin Safety Hook will boost the "safety efficiency" of your hoist many times . . . protecting workers against injury and equipment against damage from accidentally slipping loads.

Make sure your next Hoist is equipped with a LAUGHLIN SAFETY HOOK

Specify "Laughlin Safety Hooks" when ordering new hoists from your distributor. They pay for themselves many times over in accidents avoided.

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Order from your distributor according to the size now on your hoisting equipment . . . or state the capacity of your hoist and he will furnish the correct Laughlin Safety Hook to fit your needs.

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Drop-forged steel, heat-treated . . . stainless steel spring with pressed steel latch. Cast bronze latch on larger sizes. Available for ½ to 15 ton safe working loads.

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3310
½ to 15 tons

3220
½ to 15 tons

3316
½ and 1 ton

3315
750 pounds

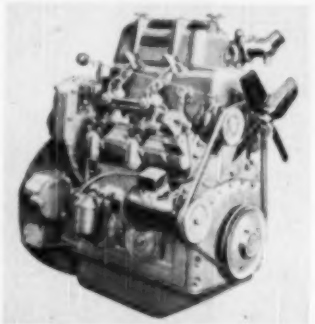
Send for Laughlin's famous data book of fittings — ask for Catalog #145. THE THOMAS LAUGHLIN COMPANY, DEPT. 6, PORTLAND 6, MAINE.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

and laminated sandstone, and offers faster speeds than obtained with pneumatic methods, according to the manufacturer. Bulletin M-105 available.—*Kennametal, Inc., Latrobe, Pa.*

WIRE-ROPE-SLING SPLICE—New "Tapered-Sleeve" splice eliminates the necessity of sling users splicing their own sling loops, and at less than what it costs them to do it themselves, according to the manufacturer. Two features of the splice, the rolled loop and single tapered sleeve, provide greater flexibility and compactness, developing full catalog strength of the Roebling Preformed "Blue Center" steel-wire rope sling, it is said. All wire ends are permanently covered and there is no thickened rope section close to the loop. Bulletin available. —*John A. Roebling's Sons Co., Trenton 2, N. J.*



NEW DIESEL ENGINE features interchangeable cylinder head and liner assembly to save time and money on maintenance and overhauls; 2-cylinder, 2-stroke cycle operation for smoother power output, swirling air-intake for better combustion and scavenging, and high power rating (52.5 hp) in light weight (1,030 lbs), according to the manufacturer.—*Harnischfeger Corp., Port Washington, Wis.*

AIR-DRILL BITS—Crowned tungsten-carbide inserts to increase drilling speeds and self-cleaning chip channels are among the design features of Rok-Drill Bits cited by the manufacturer. To prevent premature thread failure, Rok-Bit threads are designed especially for each bit size and application. Of the detachable type, the bits are available in two-point chisel type, 1½ to 4 in in diam-

Your Trucks Deliver More—for Less with EATON 2-Speed Twin AXLES

Eaton 2-Speed Axles give you both pulling power and speed in the same vehicle—instantly available to meet every specific operating need. Your trucks do more jobs, make faster trips. With Eaton 2-Speed Axles, engines run at most efficient and economical speeds; operating and upkeep costs are reduced to a minimum; thousands of miles are added to vehicle life. And Eaton's planetary design adds thousands of miles to axle life. Gear tooth loads are better distributed; gear speeds are slower; stress and wear are reduced to a minimum. Eaton 2-Speed Axles are available for most trucks of the 1½-ton class and larger. Ask your truck dealer for a road demonstration.

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

Why stepped-ply construction steps up belting life

One big reason why you get longer service life with this Hewitt Belting is the way it's made.

Its stepped-ply construction means that extra plies of strong duck have been added along both edges. And it means that a shock-absorbing layer of thick rubber cushioning has been added to the middle of the belt.

Stepped-ply construction also means belting that is more flexible crosswise, yet stiffer lengthwise—belting that conforms easily to idler profile even when the belt is empty.

Thus Hewitt not only gives you the utmost in belting strength, but better troughing as well!

And because it troughs naturally, this extra-quality belting runs true along the idlers—is less vulnerable to damage from idlers or coal-loading chutes.

"Stepped ply" construction assures natural troughing . . . less material "spill."

Solid cushion of rubber absorbs shock of heavy impacts . . . thickest where most needed.

Transverse "breaker" strip strengthens carcass . . . prevents cover from stretching beyond elastic limit.

So insist on Hewitt for all *your* conveyor belting needs. Just call the Hewitt distributor listed in the yellow pages of your telephone directory. Or write direct to the Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York.

HEWITT RUBBER DIVISION
INDUSTRIAL HOSE AND BELTING

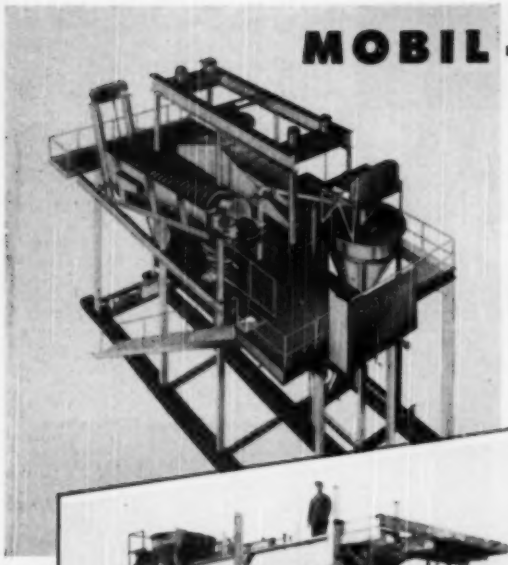
HEWITT

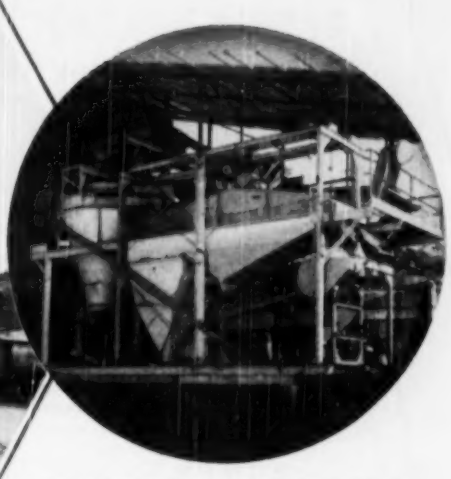
CONVEYOR BELTING

HEWITT-ROBINS INCORPORATED

MOBIL-MILLS FOR COAL CLEANING

READY TO OPERATE IN 7 DAYS!





Complete
Heavy Media plants for coal preparation, Mobil-Mills are installed, ready to operate, in only 7 days.

- Easy, field-bolting installation by crew. WEMCO field engineers will assist you at no extra charge.
- Immediate delivery on some sizes—3 to 6 weeks on others.
- Rent or buy in 5 sizes: 25 • 35 • 60 • 125 and 250 TPH feed.
- Compact, semi-portable, easy to operate.
- Sharp separations for clean coal production.

First costs of the Mobil-Mill are as low as $30.00 per ton capacity. Operating costs range from only a few cents to 25¢ per ton feed, depending on type of ore and local operating conditions.

More than 10 MILLION TONS PER YEAR (rated capacity) are being handled by WKE (HMS) Mobil-Mills. For coal preparation Mobil-Mill users include:

BELLE VALLEY COAL CO.
CHARLES E. CAMPBELL
CENTRAL SAND & GRAVEL CO.
CLEAN EAGLE COAL CO.
CHARBONNAGES D'HENSIES POMMEROEUL
MID-CONTINENT COAL CO.
NUGENT MINING CO.
R. P. M., INC.
RIDDLESBURG MINING CO.
SIMPSON CREEK COLLIERIES CO., INC.

Write today for detailed information about Mobil-Mills and other WEMCO equipment for coal preparation.

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

PRINCIPAL OFFICES
Los Angeles • Sacramento • Salt Lake City • Spokane
Pocatello, Idaho • Denver • Phoenix • Chicago
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EXPORT DISTRIBUTORS
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80 Broad Street • New York 4, N. Y.
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Milieu Dense, Paris, France
Ferdinand Egeberg & Company, Oslo, Norway
Macchine ed Impianti Ing. Donati & Co., Milan, Italy
A. Schuberth & Company, Basle, Switzerland
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Agence Miniere & Maritime, S. A. Antwerp, Belgium
Adil Gobay & Albert Koenka, Istanbul, Turkey

WKE (HMS) Mobil-Mill • Coal Spiral • Standard Thickeners (HMS) Thickeners • (HMS) Media Pumps • Hydroseparators (HMS) Densifiers • (HMS) Separatory Cones • "SH" Classifiers Sand Pumps • Conditioner and Agitators • Fagergren Flotation Machines • Dewatering Spirals • (HMS) Laboratory Units

For Maximum Safety, Dependability

in Mine Roof Support

always specify

DUFF-NORTON

MINE ROOF JACKS

Duff-Norton Mine Roof Jacks . . . jack fittings . . . angle jacks and pin timbering jacks are your best choice for all mine roof supporting jobs. Their sturdy construction combines safety and dependability with economy. To specify the *right jacks* for your needs . . .

Write today for your copy of this Handy Guide for selecting all types of Mine Jacks.

See your Local Distributor

DUFF-NORTON JACKS

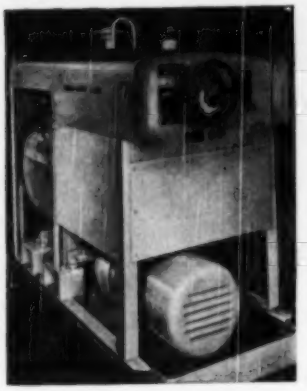
THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. — CANADIAN PLANT, TORONTO, ONT.

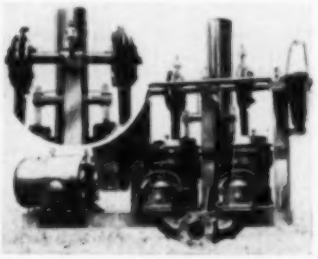
"The House that Jacks Built"

eter, and in four-point, cross-bit type, 1⅝ to 4-in in diameter.—*Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25.*

TRUCK ENGINE—New more powerful 6-cylinder Ford truck engine with 4-speed synchro-silent transmission now available as optional equipment on series F-6 Ford trucks is designed to provide even greater performance and acceleration for heavy hauling and high speed on grades, it is reported. The new Ford Rouge 254 Truck Six engine, developing a maximum of 110 hp and 212 lb-ft torque, is the largest 6-cylinder engine produced for Ford trucks and embodies many outstanding performance, economy and durability features, the company says.—*Ford Motor Co., Dearborn, Mich.*



ARC-WELDER—200-amp Hornet "Special" arc welder, combining the 36A generator with a 4-cylinder 31-hp air-cooled Wisconsin engine, has a welding range from 40 amp at 20v to 250 amp at 40 v. Features cited by the manufacturer include simplified current control, self-contained exciter and readily accessible welding terminals. A two-wheel trailer-type rubber-tired running gear is available as optional equipment.—*Air Reduction Sales Co., 60 E. 42nd St., New York 17.*



SLUDGE PUMPS—Modified design optional for entire line of Carter plunger sludge pumps is said to offer greatly increased pumping efficiency and reduced down-time. The new

This Parrish-type classifying and dewatering screen has been equipped with Stainless Steel perforated plate for longer life and increased output.

Seems like a wild idea at first— but it's an accomplished fact

UNTIL very recently, coal men usually thought of Stainless Steel as something of a "luxury type" material. But today, they are recognizing Stainless as the answer to their toughest preparation-plant problem—finding *a perforated screen that will last.*

Already, in many of the country's busiest and most efficient plants, Stainless Steel has demonstrated dramatically that it far outlasts other materials in severe service on cleaning, sizing and dewatering screens. Stainless' superior performance in this type of equipment —which actually makes it the *cheapest* of all materials to use—is due to these outstanding advantages:

Stainless Steel screens resist wear—abrasive action of coal and refuse has less effect on this durable material.

Stainless Steel screens resist corrosion—they'll stay in good condition longer under severest conditions, even in intermittent operation.

Stainless Steel screens reduce "blinding"—perforations remain clean and smooth because Stainless Steel resists the corrosive action of acid mine water.

Stainless Steel screens maintain size—holes in Stainless Steel screens don't enlarge like other materials to permit oversize material to pass through.

Stainless Steel screens weigh less—because Stainless is so strong and tough, screens can be made thinner and lighter, reducing tendency to "blind" and cutting down machinery wear.

All these advantages add up to longer screen life . . . fewer replacements . . . less shutdowns . . . increased output at lower cost.

U·S·S Stainless Steel has been proved by performance in this type of application. U·S·S 12 is the most popular grade, but many operators with unusually severe conditions are using U·S·S 18-8. U·S·S Stainless Steel can be supplied with virtually any type and size of perforation. It will pay you to specify U·S·S Stainless Steel when you take advantage of this cost-saving material in your preparation plant.

Write today for your copy of the new booklet, "Stainless Steel Screens for Coal Preparation Plants." Send a postal card or letter to Carnegie-Illinois Steel Corporation, 2131 Carnegie Building, Pittsburgh 30, Pennsylvania.

Compare the average life!

Type of steel	Hours of average life
Common steel	310
Punched slot bronze	245
Mill slot bronze	941
Copper-silicon alloy	1049
U·S·S 12	1156
U·S·S 17	1471
U·S·S 18-8	1506
U·S·S 18-8 Perforstrand perforated jackets	2902

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

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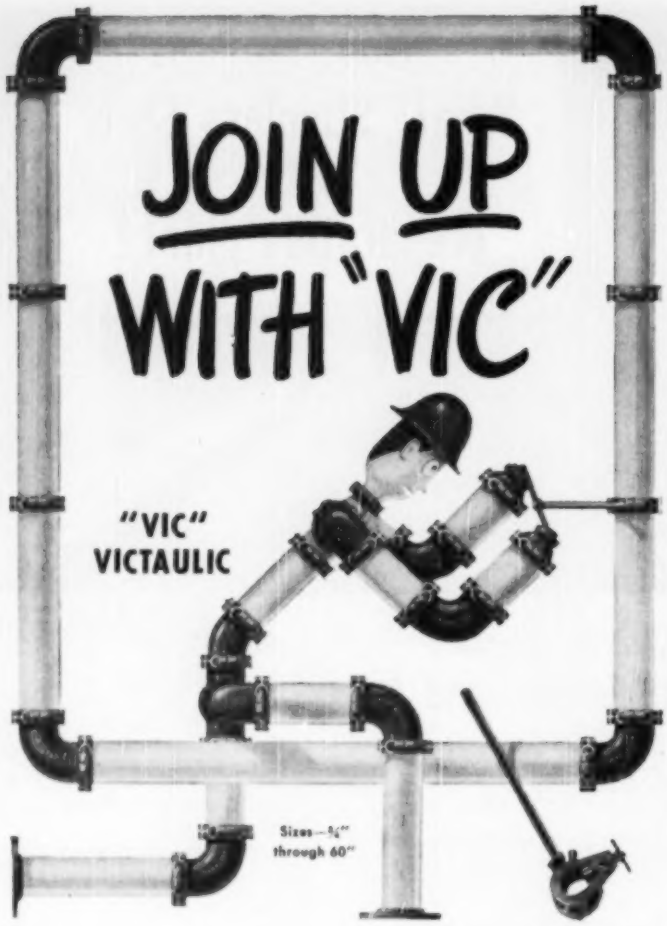
UNITED STATES STEEL



For a *permanent* solution to your piping problems . . . you can't beat VICTAULIC Couplings, Victaulic Full-Flow Elbows, Tees and other Fittings.

Yes, sir! The COMPLETE Victaulic Line is designed to give you speedy, dependable piping construction . . . AND save you lots of extra work . . . many extra dollars!

A simple two-bolt design for quick, easy hook-ups . . . only a Standard T-Wrench needed to make connections . . . long-lasting, positive-locked joints that will stand up under extreme pressure, vacuum, or strain conditions . . . THAT'S WHAT "VIC" OFFERS YOU!

AND AS FOR FITTING THOSE PIPE ENDS . . . It's easy! "Vic-Groover" grooves 'em automatically in half the time of a conventional pipe threader! Write today for these two:

Victaulic Catalog and Engineering Manual No. 44. "Vic-Groover" Catalog No. VG-47.

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26TH VICTAULIC YEAR

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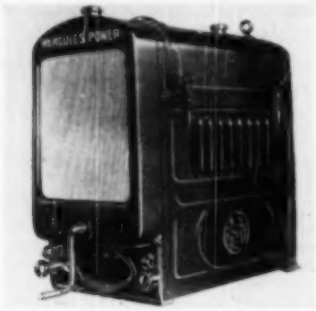
The easiest way to make ends meet
VICTAULIC
PIPE COUPLINGS AND FITTINGS

crosshead-guide-rod assembly is designed to eliminate misalignment of the plunger and any tendency toward eccentric motion of the plunger in the vertical path, reducing excessive wear on the packing gland as well as wear on the plunger and cylinder, according to the manufacturer.—*Ralph B. Carter Co., 210 Atlantic St., Hackensack, N. J.*

AUTOMOTIVE DIESELS — Two new 6-cylinder high-speed Cummins diesel engines designed for on- and off-highway automotive applications, the HRBB-600 (highway) and HRBBI-6000 (off-highway), have a maximum rating of 175 hp at 2,000 rpm. Built for use where flexibility of higher rotative speeds and performance of higher horsepower are needed, the units feature, according to the manufacturer, the following: fully counterbalanced crankshaft; camshaft of new design; viscous-type torsional vibration damper; and a revised fuel pump. Both engines have a piston displacement of 743 cu in, a 5½-in bore and 6-in stroke.—*Cummins Engine Co., Inc., Columbus, Ind.*



GASOLINE ENGINES—Three new 4-cylinder gasoline-power units designed for high-speed heavy duty have been added to the Hercules line to provide users a broader choice to more economically meet specific power needs. Model JX4E has a 3½-in bore, 4¼-in stroke and 164-cu in displacement; JX4C, 3¾-in bore, 4¼-in stroke and 188-cu in displacement; and JX4D, a 4-in bore, 4¼-in stroke and 214-cu in displacement.—*Hercules Motors Corp., Canton, Ohio.*

•

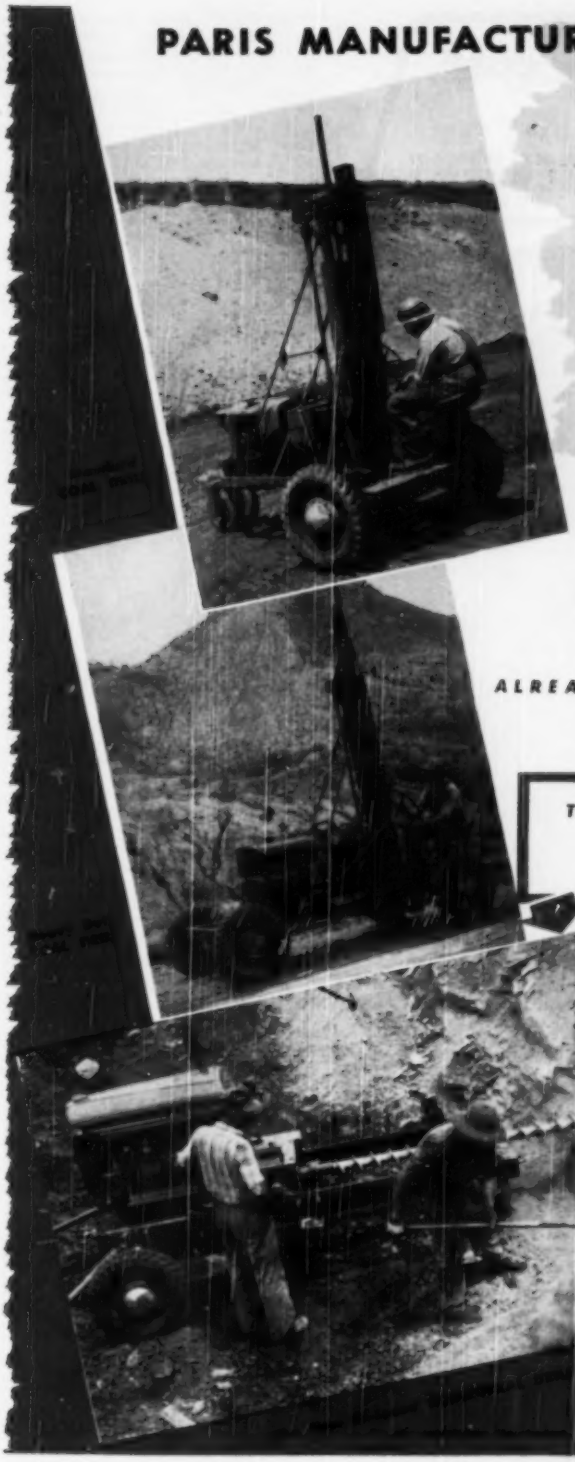
Equipment Shorts

PREFABRICATED HOMES—Two enlarged variations in the low-cost "Champion" home series being made by the home-manufacturing subsidiary of United States Steel are: the Champion No. 2, including two bedrooms and 768 sq ft, designed to sell for approximately $6,800; and the No. 3, including three bedrooms and 864 sq ft, priced to sell for about

PARIS MANUFACTURING COMPANY

Announces

THREE *NEW* DRILLS



The PARMANCO Coal Drill will drill 2⅛ inch holes at a speed of up to six feet per minute in #5 coal. Equipped with heavy duty truck-type transmission and rear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 12 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

United Electric Coal Companies	6	Enos Coal Mining Co.	1
Ayrshire Collieries Corp.	2	Hunterville Sinclair Mining Co.	4
Big Bend Collieries, Inc.	1	Truax-Traer Coal Company	1
Little Sister Coal Corp.	1		

THIS UNIT IS DELIVERING 6-INCH SHOT HOLES — READY FOR LOADING at Better Than a Foot a Minute ! ! !

The new PARMANCO Hi-Speed Horizontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time —a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

Clean Coal at low cost calls for SECO VIBRATING SCREENS

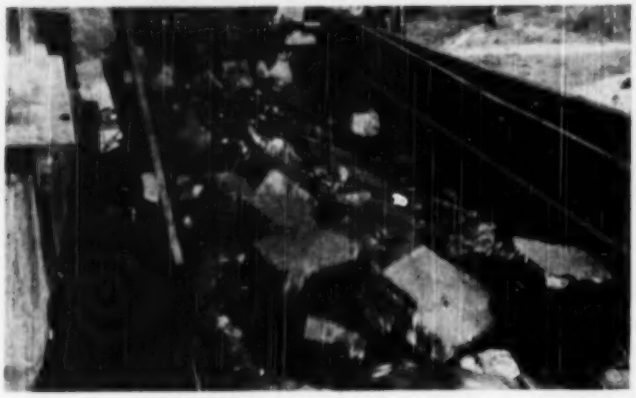


Photo Taken at Hockersmith Coal Co., Manchester, Ky.

Today—the big market is for clean, properly-sized coal. That's why more and more operators are turning to dependable Seco vibrating screens—for all their cleaning and sizing requirements. Smooth operating Seco vibrating screens are built to take it. Built to give maximum tonnages month after month; year after year—with little or no maintenance. It all adds up to clean coal—at lowest cost—and greater profits for you.

Make the sizes your customers are calling for! Seco vibrating screens in single, double or triple deck models may be equipped with wire cloth or perforated plate to give you any size or sizes of coal you desire.

Let Seco screening experts help you get clean, properly-sized coal — at low cost. Write Dept. CA-1 for Coal Bulletin #11.

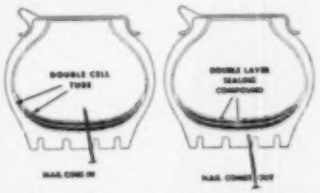
SECO VIBRATING SCREENS

SCREEN EQUIPMENT CO., INC.

1752 WALDEN AVE. BUFFALO 21, NEW YORK

In Canada, United Steel Corp. Ltd., Toronto, Ont.

$7,500. Both prices include the lot. The national average price for the No. 1 unit previously announced is approximately $6,300, including lot, and provides 672 sq ft. Among improvements in the new models are optional parquet floors, larger room dimensions and an expanded utility room. —*Gunnison Homes, Inc., New Albany, Ind.*



PUNCTURE SEALING TUBES previously designed for passenger cars now are available for General truck tires and reportedly are expected to cut down flats, speed servicing and reduce costs. As shown above at the left, two layers of the self-sealing compound cling to a nail as it enters the tire and as the nail is pulled out, at the right, the sealing compound closes the hole without loss of air, the company reports.—*General Tire & Rubber Co., Akron, Ohio.*

EMERGENCY FLOODLIGHT—Circle D-150 portable floodlight, weighing only 6 lb, is built of alloy cast aluminum with a large tip-proof base and heat-free handle and is designed for easy portability and service under varied weather conditions. Sealed-beam interchangeable 200-, 300-, or 500-w lamps fit into a spring-mounted mogul receptacle and are held against a heat- and moisture-proof vibration seal. Bulletin available.—*Natale Machine & Tool Co., 339 State Highway No. 17, Carlstadt, N. J.*

RESPIRATORS—New line of R5000 twin-cartridge respirators is said by the manufacturer to have been specifically developed to provide protection, through a basic face piece and seven interchangeable filters, against these hazards: (1) a combination of all dusts, (2) organic vapors, (3) acid gases, (4) combined acid and organic gases, (5) ammonia, (6) combination of organic vapors and all dusts, and

"WE GOT MIGHTY TIRED SITTING UP NIGHTS WITH SICK BELTING

Then we tried the Thermoid treatment! Now we're sitting pretty!"

"Here at the Quarry we operate 9 hours a day, 6 days a week. Our conveyor belting on flight No. 1—where the belting really takes a beating from big, jagged, saw-toothed rocks—was giving us plenty of trouble.

"Because of our long work-week, the men began grumbling about having to put in so much extra time late at night repairing rips and tears in this beat-up belting.

"So we called up our belting distributor and he brought a Thermoid engineer around. 'What you need,' said the engineer, 'is Thermoid "H.T." belting with a special soft rubber ply that will cushion those rocks like a cradle.'

"That was several months ago. Now, after watching that Thermoid 'H.T.' belting take the most savage pounding imaginable, we know it is a quality product that can be depended on to stand up under plenty of slam-bang punishment.

"If you have a belting problem, Mister, why not get in touch with your Thermoid distributor. Whether your problem is run-of-mill or highly specialized, he'll help you solve it—efficiently and economically."

A Complete Line of Quality Rubber Products For All Industrial Needs

In addition to Conveyor Belting, Thermoid makes Transmission Belting, F.H.P. and Multiple V-Belts, Elevator Belting, and a complete line of Wrapped and Molded Hose, Industrial Brake Linings and Friction Materials.

It will pay you to *Specify* Thermoid!

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.

Western Offices and Factory • Nephi, Utah, U. S. A.

Industrial Rubber Products • Friction Materials • Oil Field Products

PLENTY OF PULL!

WITH WORLD'S LARGEST MAGNETIC PULLEY

Yes, sir, here's a magnetic pulley with *plenty* of pull! Especially designed to give complete tramp iron protection under heavy loads, this 60" diameter Electro-Magnetic pulley is installed ahead of a coal pulverizer at a large power station.

As an indication of its tremendous magnetic power — note how the 3" bolt has been pulled to the face of the pulley from nearly 2½ feet!

You may not require so large a pulley or magnetic separator to protect your machinery or purify your product, but whatever your requirements, consult STEARNS MAGNETIC — largest exclusive manufacturers of magnetic separation and transmission equipment. Write for Bulletin 303 today.

For certain light duty applications, STEARNS Permanent Magnetic Pulleys may be used. The best permanent magnetic pulleys money can buy, they require no wiring, are easily installed and eliminate operating expense. Ask for Bulletin 350-A.

Stearns

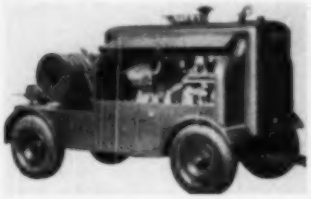
Electro and Permanent Magnetic Pulleys

Stearns MAGNETIC MANUFACTURING CO.

661 S. 28 St., Milwaukee 4, Wis.

(7) metal fumes. Depending on the user's needs, the units are available with one or more pairs of filters, which can be quickly installed, thus reducing stocking of various respirators.—*American Optical Co., Southbridge, Mass.*

METAL-HARDENING COMPOUND—"High-Speed-It," a compound for case and depth hardening of mild steel developed by the Newcamp Metallurgical Laboratories (*Coal Age*, August, 1948, p. 176), now is being marketed by Wilson Carbon Co. Bulletin 11 available.—*Wilson Carbon Co., 60 E. 42nd St., New York 17.*



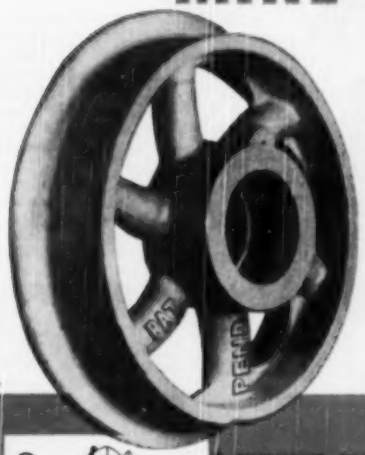
AIR COMPRESSORS—New line of special-order custom-built heavy-duty compressors, known as Air Chief AIRistocrats, reportedly offer advanced design and accessory features not available in standard units. Production of the custom-built units will be limited to 100 a year in 105- and 210-cfm sizes and 50 a year in 160- and 315-cfm capacities, the company announces. Features include an extra-heavy welded-steel virbrationless frame, electric starting, fenders, locking gas cap, hand parking brakes and electric service brakes.—*Davey Compressor Co., Kent, Ohio.*

SHAFT COUPLINGS—Centrifugal clutch-type couplings for fractional- and unit-horsepower applications feature simple construction, low cost, low upkeep, and adjustability for use between pumps, fans, power tools, etc., and their drives. Coupling permits motor starting free of external load, reduced starting current and mechanical protection from overloads, it is said.—*Centric Clutch Co., 22-26 South Ave., West, Cranford, N. J.*

PIPE AND CONDUIT MARKER—New "Quik-Label" self-sticking pipe marker for identifying small-diameter pipe and conduit from ¼ to 2 in has been added to line of markers formerly available only for pipe over 2 in. Some 600 stock labels, as well as special markers, now are available mounted on cards for ease of handling and application. Folder and sample cards available.—*W. H. Brady Co., Dept. 74, 815 No. Third St., Milwaukee, Wis.*

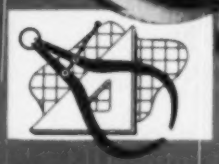
HEAVY-DUTY SHELVING for toolrooms, stockrooms and warehouses features quick and easy assembly. Studs are used instead of bolts and

STERLING'S NEW ROUND SPOKE MINE CAR WHEEL



Designed for uniform strength . . . longer service . . . less maintenance . . . lower costs.

STERLING *Leads Again* — with a *new* round-spoke mine car wheel designed to assure greater mileage — reduce mine car operating costs these *four* important ways!



EXCLUSIVE BALANCED DESIGN . . . smoother transportation . . . less wear and tear on track, car and wheels.

WITHSTANDS GREATER CRUSHING FORCE in actual tests, loadings of 150 tons have failed to crush any new STERLING round spoke Wheel.

80% STRONGER 8% HEAVIER NO ADDITIONAL COST

SOUND CASTINGS Assure Higher Quality, Greater Strength . . . Reduce Wear to a Minimum.

New **STERLING** cast steel round spoke wheels can help lower *your* mine car operating costs. Contact your nearest Sterling representative for complete information on Sterling wheels . . . and miscellaneous steel castings.

REPRESENTATIVES: R. E. GERDETZ EQUIPMENT CO., Law & Commerce Bldg., Box 423, Bluefield; H. P. HILLHOUSE JR., 20 N. 21st St., Birmingham, Alabama; J. E. NEISER, 720 Roselawn Ave., Pittsburgh, Pennsylvania; SERVICE SUPPLY CO., Hawley Bldg., Wheeling, W. Va.; WETZEL EQUIPMENT AGENCY, 375 Southwest Temple St., Salt Lake City, Utah

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SHEAVES

CAGES

SKIPS

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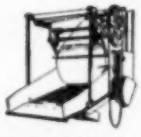
LABORATORY CRUSHERS

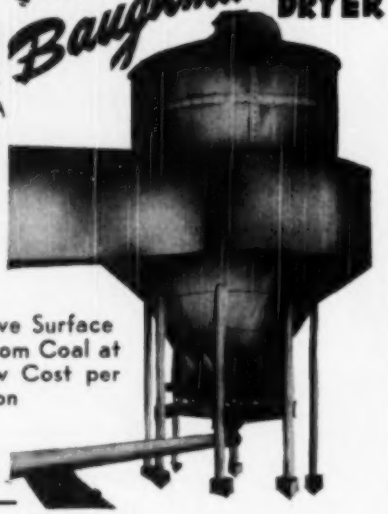
HOISTS

VIBRATING SCREENS


DUSTOLATORS

Wet Coal Can Be Dried Economically

NEW! Baughman VERTI VANE DRYER



Will Remove Surface Moisture from Coal at a Very Low Cost per Ton

CHECK THESE FEATURES—

1. Degradation is negligible.
2. Slow movement of coal permits low temperature gases.
3. Low temperature operation prevents overheated product and increases furnace life.
4. Cooling chamber assures cool dried coal.
5. Vertical construction requires minimum floor space.
6. Coal movement control eliminates need of dust collectors.
7. Fine coal may be left in wet product, thus making auxiliary drying equipment unnecessary.
8. High thermal efficiency gives more dried product per quantity of drying heat produced.
9. Initial cost lower than other type dryers.
10. Operating costs and horsepower requirements are exceptionally low.
11. Operation and controls are extremely simple.
12. Outstanding for continuous service without shutdowns for maintenance.
13. High maximum hourly tonnage capacity.
14. Easily adjusted for rate of feed.

Write us for further information about Baughman Verti-Vane Coal Dryers. Our sales and technical staffs are always ready to help you solve specific coal preparation problems.

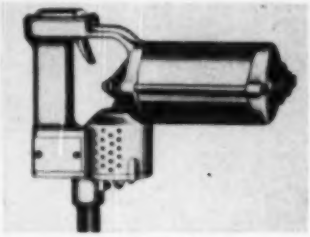
ENGINEERS, MACHINISTS
STEEL FABRICATORS
PATTERN MAKERS
GREY IRON FOUNDERS

DANVILLE ROBT. HOLMES BROS. ILLINOIS

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

nuts in attaching shelves to angle posts. Shelving is offered in 36-in widths, 12 to 24-in depths and 6- to 10-ft heights.—*Precision Equipment Co., 3710 Milwaukee Ave., Chicago, Ill.*

AIR HOSE—Oil-proof rubber compounds on 3-ply fabric reinforcement result in an improved air hose, with extra toughness in the smooth-finish red cover and strong adhesion of cover to carcass resisting bending and flexing without separation, it is said. Sizes include ¼-, 5/16-, and ⅜-in inside diameter. Smaller sizes reportedly withstand 150 psi and the larger, 125 psi.—*B. F. Goodrich Co., Akron, Ohio.*

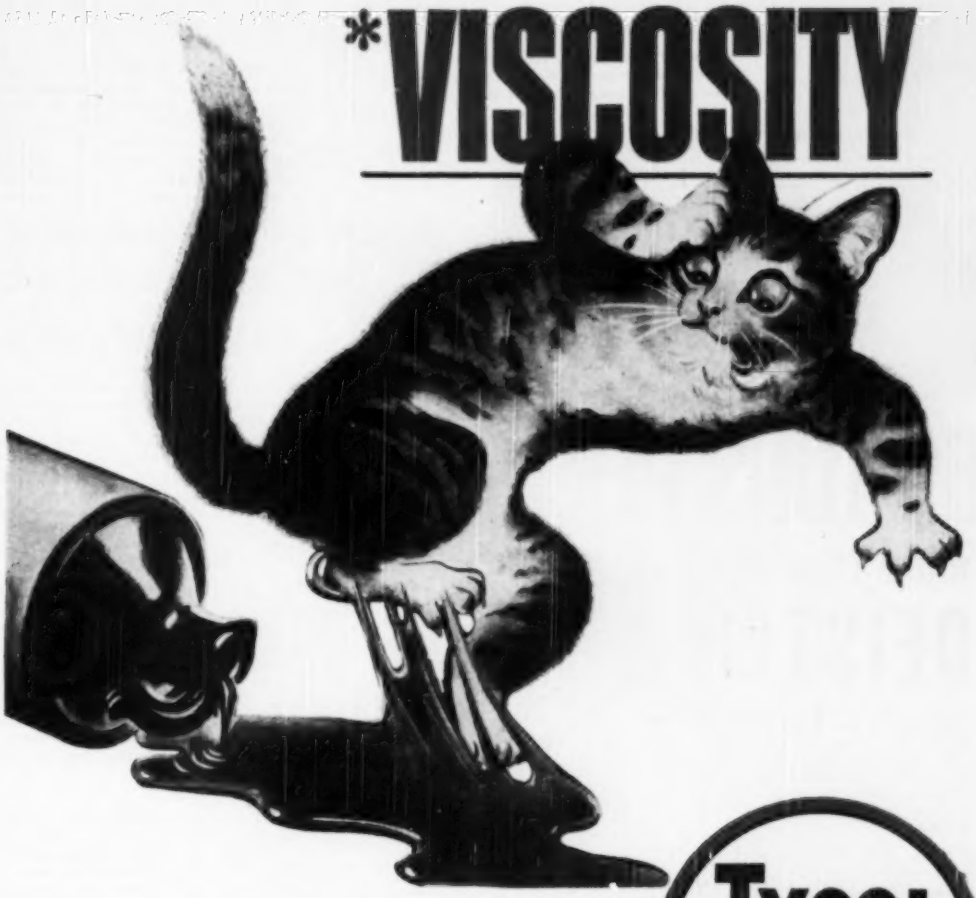


ELECTRIC HAMMER—Model 10 "Electromagnetic" hammer, having a ⅝-in diameter drilling capacity, is an entirely self-contained light-weight unit, according to the manufacturer, with the rectifying unit incorporated in the handle casting so that the operator plugs the hammer cord directly to the 110-ac power source. Designed particularly for use on ladders and scaffolds, the hammer uses the complete line of Syntron hammer tools. Bulletin available.—*Syntron Co., 975 Lexington Ave., Homer City, Pa.*

BATTERY CHARGER—New "Universal" charger is designed for charging 200- to 500-amp-hr lead-acid batteries of 12-, 15-, 16- and 18-cell capacity and/or 150- to 450-amp-hr nickel-iron batteries of 20-, 24- and 30-cell capacity. The unit consists of a separately excited mg set with a no-load voltage control of 30 to 60 v calibrated for the different cell combinations of batteries to be charged, plus a voltage-drop control.—*Motor Generator Corp., Hobart Sq., Troy, Ohio.*

OXYACETYLENE - WELDING—"Flamecraft" oxyacetylene welding and cutting outfit, to be marketed as a "package," includes oxygen and acetylene cylinders, welding torch, cutting attachment, tips, regulators, hose, goggles, cylinder truck, fluxes, assorted rods and an instruction folder. The 60-ft acetylene and the 122-ft oxygen cylinders are supplied on a lease basis for a 25-yr period, the estimated lifetime of the cylinders, thus eliminating demurrage charges and guaranteeing maintenance of the cylinders. The unit sells for $166.87,

*VISCOSITY



All equipment will last longer — give better service — if you use the proper lubricant. That's why you'll find it profitable to use Tycol high quality oils and greases.

There's a reason! No matter what your lubrication need — for roll neck bearings or mine cars, Diesels or high speed textile spindles, turbines, paper calenders or steam engines . . . where *VISCOSITY, penetration, extreme pressure is a factor — Tycol has a lubricant suited to your specific requirements.

Refined from selected crudes, Tycol lubricants are exceptionally resistant to breakdown which means greater economy . . . longer life for every type of equipment.

Let us show you the extra value in every measure of Tycol lubricants. Write your nearest Tide Water Associated office today.

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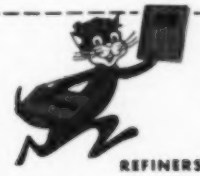


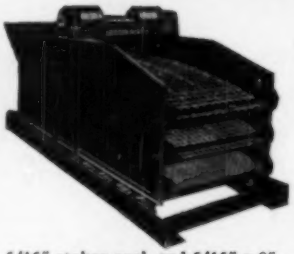
*LEARN WHAT THIS PRODUCT CHARACTERISTIC MEANS TO YOU — READ "LUBRICANIA" This informative handbook, "Tide Water Associated Lubricania," gives clear, concise descriptions of the basic tests used to determine important properties of oils and greases. For your free copy, write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

REFINERS AND MARKETERS OF VEEDOL — THE WORLD'S MOST FAMOUS MOTOR OIL

From a 130-ft. shaft over a 48-inch vein, the D. L. Bradley Coal Company of Moberly, Missouri, produces sized coal rated at 11,000 BTU.

60 TONS PER HOUR

with a Triple-Deck DEISTER



All crushed coal goes across a three-deck 3' x 6' Deister Vibrating Screen at the D. L. Bradley Coal Company mine near Moberly, Missouri. With the screen handling 60 tons an hour, peak loads sometimes reach over a ton a minute.

D. L. Bradley, owner of the mine, says:

"This screen does a very nice job of sizing. Despite the fact that we work the year 'round, and handle as much as 60 tons an hour, we have never had any expense or trouble since we installed the Deister more than three years ago."

The Bradley mine screens for 3" x 6" egg, 3" x 1¼" nut, 1¼" x 5/16" stoker coal, and 5/16" x 0"-minus, the latter for power plants in the vicinity.

Accurate, high-capacity, low-maintenance operation like this day after day is the performance you can expect with Deister Vibrating Screens. And it is the kind of performance that has led more and more mine operators to prefer Deister screens to prepare their coal for market. Why not get full details on Deister Vibrating Screens for your operation? No obligation—just write to

DEISTER SCREENS

DEISTER MACHINE CO.

FORT WAYNE 4, INDIANA

less gas.—*Air Reduction Sales Co., 60 E. 42nd St., New York 17.*

LUBRICANT PUMP—Model 1837 Centro-Matic electric-motor-operated drum pump is designed for use with original 55-gal barrels or 400-lb drums in the Lincoln Engineering centralized single-line lubrication systems where compressed air is not available or where electrical equipment is preferred. Powered by a standard 1-hp motor, the pump features fast, positive delivery of heavy, viscous or fluid lubricants. Bulletin 800-1 available. —*Lincoln Engineering Co., 5729 Natural Bridge Ave., St. Louis 20, Mo.*

ROLLER CHAIN — Baldwin - Rex "BA" roller-chain assembly is said to combine cost and service advantages of riveted chain with ease of assembly of cottered roller chain. The 5-ft lengths of standard riveted roller chain have a new single-pin connector at the 2-ft mark and at the end that is readily disconnected by removing a detachable pin.—*Baldwin Duckworth Division, Chain Belt Co., Springfield 2, Mass.*

SHAFT SEAL—A new mechanical shaft seal confines corrosive and abrasive liquids in applications unsuited to packing. Cartridge-constructed seal reportedly resists pressure of 400 psi and is available for shafts from ⅛ in to 3 in in diameter. Bulletin B-571 available.—*Peerless Pump Division, Food Machinery & Chemical Corp., 301 West Ave. 26, Los Angeles 31, Calif.*

CORROSION - RESISTING PUMP —Self-priming centrifugal pumps are available in corrosion-resisting alloys. Alloy deflectors protect bearing in power end, and impeller nuts are eliminated to prevent impeller-head loosening. Pumps now available in two sizes: (1) 20 gpm against 81-ft tdh to 160 gpm against 33-ft tdh; (2) 40 gpm against 125-ft tdh to 240 gpm against 75-ft tdh, at 1750 rpm.—*Duriron Co., Inc., 17 E. 42nd St., New York 17, N. Y.*

STEEL ELECTRODE—Steel-Tectic reportedly is a new-principle high-speed 5/32-in electrode that welds bead over bead without the need for removing slag and can be used at as low as 50 amp on thin steel without danger of burning through, it is said. —*Eutectic Welding Alloys Corp., 40 Worth St., New York 13.*

1½% SOCIAL SECURITY TAX CHART shows at a glance amounts due at new 1½% rate on all sums up $1,000 and saves hand or machine calculation. Priced at $2.50, the Delbridge chart is available from office supply or stationery dealers or from the manufacturer.—*Delbridge Calculating Systems, Inc., 2502 Sutton Ave., St. Louis 17, Mo.*

New

COALMASTER "1046" DRILL BIT CUTS DRILLING TIME AND COST FOR 1⅞" HOLES

1 One piece—solid shank assures longer life.

2 No drill head needed—bit fits directly into socket.

3 Scientific 2-prong spiral design reduces power consumption.

4 Special analysis heat-treated steel cuts faster, retains sharp edge longer.

5 Quick-change detachable socket fits directly into Series 0875 Coalmaster Auger.

COALMASTER

Save drilling time—reduce your overhead with the new Coalmaster "1046" DRILL BIT. Available through the following distributors:

CENTRAL MINE EQUIPMENT COMPANY
ST. LOUIS 13, MO.

AUSTIN POWDER COMPANY, Cleveland, Ohio • THE BUDA COMPANY, Harvey, Illinois • DIAMOND SUPPLY COMPANY, INC., Evansville, Indiana • DOOLEY BROTHERS, Peoria, Illinois • DRILLMASTER SUPPLY CO., Evansville, Indiana • ILLINOIS POWDER MFG. CO., St. Louis, Missouri; Denver, Colorado; Salt Lake City, Utah • JOY MFG. CO., Main Office: Pittsburgh, Pa.; Subsidiaries and Representatives in 57 Countries • MOBILE DRILLING, INC., Indianapolis, Indiana • SALEM TOOL COMPANY, Salem, Ohio.

Equipment Publications

New Bulletins Available Without Charge on Request to the Manufacturer—Arranged for Your Convenience to Permit a Quick Check of Items of Interest—Literature on New Equipment Described on Previous Pages Also Is Normally Available From the Manufacturers

ADJUSTABLE - SPEED DRIVES — General Electric Co., Schenectady 5, N. Y. Titles and numbers of five bulletins on adjustable speed are: "Adjustable Speed" (GEA-5334); "Adjustable-Speed ACA Motors" (GEA-4883A); "Speed Variator" (GEA-5335); "Electronic Speed Variator" (GEA-5336); "Thy-Mo-Trol Adjustable-Speed Drives" (GEA-5337). The first summarizes the specific benefits that can be expected from properly applied adjustable speed. It provides a convenient check list of points to consider in selecting an adjustable-speed drive and gives a clear picture of various packaged units, their range of application and performance features. The other four contain complete descriptive and application data for the specific equipments involved, including their features, advantages, operating characteristics and ratings.

ALLOY STEEL—Jones & Laughlin Steel Corp., Pittsburgh 30, Pa. Brochure, "The Transportation Steel," describing Otiscoloy low-alloy high-strength steel, offers complete technical data, including physical properties, fabricating operations and industrial applications in trucks, tank semi-trailers, road machinery, power shovels and cranes and mining equipment.

BALL BEARINGS—New Departure, Division of General Motors Corp., Bristol, Conn. Bulletin describes and illustrates five distinct types of New Departure self-sealed and lubricated-for-life ball bearings designed for belt and trolley conveyors, foundry-mold car wheels and similar applications and includes dimensional and load-capacity data.

BEARINGS AND CASTINGS—National Bearing Division, American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo. Catalog, "Bronze and Copper Bearings and Castings," details physical properties and comparative specifications for 27 different bronze alloys and 5 aluminum and manganese bronzes. It contains an outline of the many applications of bronze, sizes and weights of rough and machined "Tiger" bronze bars, descriptions and uses of babbitt metals and discusses the company's manufacturing facilities.

BLOWERS & EXHAUSTERS—Roots-Connersville Blower Corp., Connersville, Ind. Bulletin 120-B-14 covering centrifugal blowers and exhausters discusses the operating advantages and design and construction features of both single- and multi-stage units, with data on approved regulating devices and typical installations.

CASTINGS, MACHINING, ETC.—Hardinge Mfg. Co., 240 Arch St., York, Pa. Bulletin AS-409 illustrates and describes Hardinge manufacturing-jobbing plant facilities in detail, including types of patterns, castings, machine work and plate steel work handled in the plant and examples of custom-built machinery.

COAL PREPARATION — Roberts & Schaefer Co., 130 N. Wells St., Chicago 6. Bulletin 173, "Prepare for Profit," discusses up-to-date preparation methods and machines, using actual plants to demonstrate, step by step, how typical preparation problems have been approached and solved. Detailed information on the design and operation of R&S preparation equipment and processes is included.

CONCRETE FLOORS — The Master Builders Co., Cleveland 2, Ohio. Booklet offers detailed information on characteristics and application of masterplate "Iron-Clad" concrete floors, said to feature an iron-armored surface about ¼-in. thick that wears at least five to six times longer than a plain concrete floor, is spark-resistant, static-disseminating, non-dusting, corrosion-resistant, easy to clean and economical. Numerous installations are illustrated and application methods described.

DIESEL ENGINES—Cummins Engine Co., Columbus, Ind. Bulletin 5287 on the Model HR-600 and Bulletin 5289 on Model HRS-600 contain complete specifications of all automotive and industrial models of the two diesel-engine units, with standard and optional equipment, installation, torque horsepower and fuel-consumption data, operating features, etc.

COAL FLOTATION — Denver Equipment Co., 1402 17th St., Denver 17, Colo. Bulletin F10-B37 describes how Denver "Sub-A" flotation recovers and cleans waste coal fines at a total cost of 20 to 50c per ton and includes a typical flowsheet, data on laboratory tests, sources of feed and equipment required.

EYE SAFETY—American Optical Co., Southbridge, Mass. Booklet, "How to Set Up and Conduct a Safety Rx Program," contains information useful in establishing or expanding a program of eye safety through the use of prescription safety goggles and includes suggestions on how to obtain the necessary professional services to implement an eye-safety program and step-by-step instructions on the use of a new Safety Rx Order Book supplied by the company to industrial concerns.

FLAME-CUT PARTS — Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Bulletin illustrates intricate and unusual steel shapes cut to customer's order with the company's new Electric-Eye flame-cutting equipment, said to permit sharper, squarer corners and greater accuracy.

FLUID DRIVES—Link-Belt Co., 307 N. Michigan Ave., Chicago 1. Bulletin 2385 covers Link-Belt Electrofluid drives, including types, sizes, arrangements and dimensions of units available, features of construction, advantages to the user, selection tables, typical examples of fluid drive selections and actual installations.

HEAVY-MEDIA SEPARATION—Link-Belt Co., 307 N. Michigan Ave., Chicago 1. New sound color motion picture available for showings describes and illustrates Link-Belt heavy-media-process equipment, including a step-by-step demonstration of the equipment in operation at an anthracite plant at Mahanoy City, Pa.

LABORATORY CRUSHERS AND GRINDERS—American Pulverizer Co., 1437 Macklind Ave., St. Louis 10, Mo. Bulletin, "For Better Testing and Small-Scale Reduction," describes in detail the many applications of the company's laboratory crushers, grinders and shredders for the reduction of coal and other products, with typical installations diagrammed and explained and discussion of construction features and functional advantages.

LUBRICANTS—Keystone Lubricating Co., 21st and Lippincott Sts., Philadelphia 32. New edition of the Keystone Application Guide presents Keystone specialized lubricants for industrial and automotive machinery and includes tested recommendations for lubricating all types of bearings under various operating conditions lubrication of power-generation, transmission and materials-handling equipment; and special recommendations for various equipment subjected to contact with acids, alkalies and moisture.

PORTABLE LIGHT AND POWER WIRING—Mines Equipment Div., Joy Mfg. Co., Dept. 2, Oliver Bldg., Pittsburgh 22, Pa. Bulletin SL202 describing String-a-lite lines for portable light and power transmission illustrates and prices latest designs of these assemblies, which are sectionalized to simplify installation, provide maximum portability and, when connected, are said to be dirtproof, moistureproof and oil-resistant.

PUMP—Thomas Foundries, Inc., Birmingham, Ala. Bulletin covers the features, construction and application of the Thomas "Durable" dredge pump designed for economical pumping of solids.

PUMP SEALS—Byron Jackson Co., Pump Division, Los Angeles 54. Bulletin describes three types of Byron Jackson mechanical seals designed for sealing stuffing boxes in centrifugal pumps handling hot and cold liquids, either corrosive or non-corrosive.

ROOF-BOLTING—Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. Bulletin M-206 describes and illustrates equipment required and methods used for roof-bolting, and features a section on factors determining selection of the drilling equipment most suited to any particular condition. Detailed data and specifications are provided on Joy stopers, mine-air compressors and other equipment.

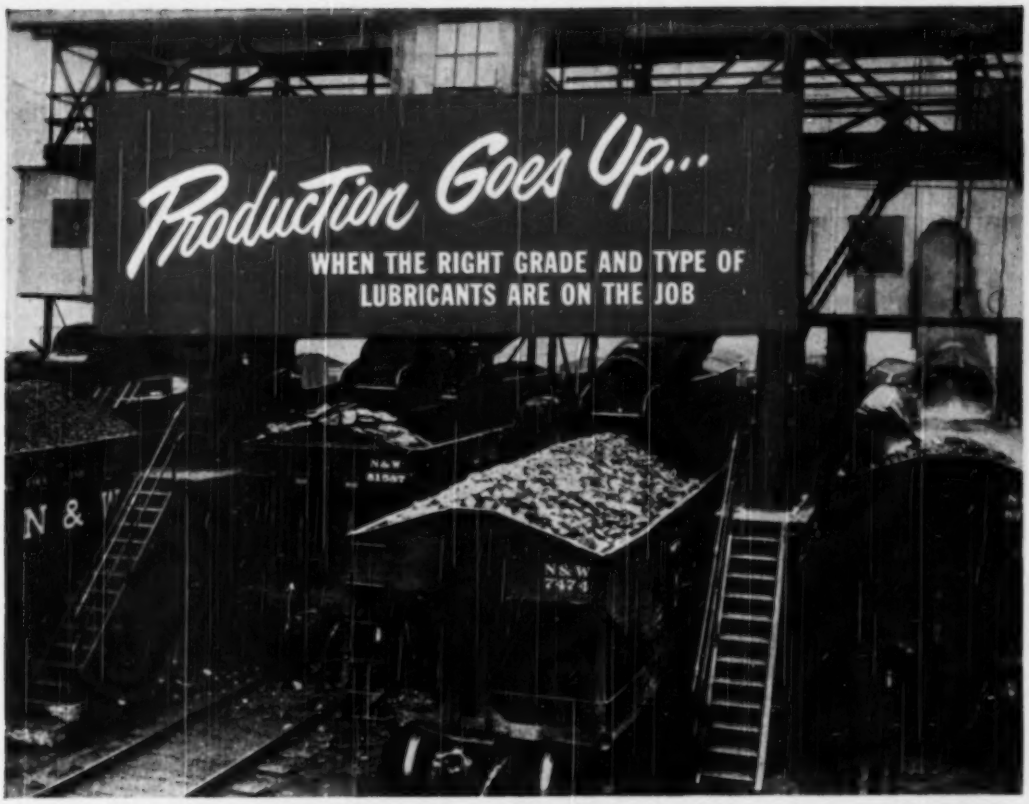
SAFETY EQUIPMENT—Willson Products, Inc., Reading, Pa. Industrial safety-equipment catalog provides product information on the company's line of eye and respiratory equipment and contains technical and reference material to help the user select the proper type and style of equipment for the specific occupational hazard involved, with information on its use and care.

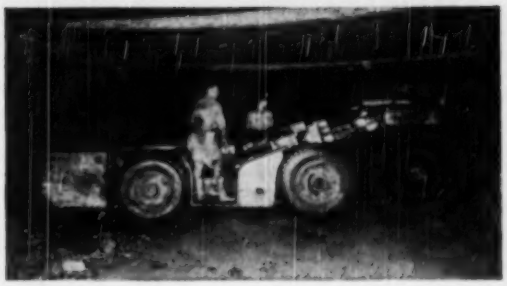
SHELVING, LOCKERS, ETC.—Precision Equipment Co., 3714 N. Milwaukee Ave., Chicago 41. Catalog features steel shelving, clothing lockers and other steel equipment available for immediate delivery, including a new type of heavy-duty steel shelving and streamlined work benches.

SHORTWALL TRUCK—Jeffrey Mfg. Co., Columbus 16, Ohio. Bulletin 823 provides details on the Jeffrey rubber-tired cable-reel unit designed for transporting any type or make of shortwall machine. Specifications and operating features are included.

SHOVEL AND CRUSHER PARTS—Kensington Steel Co., 505 E. Kensington Ave., Chicago 28. Bulletin 1049 pictures and describes wearing parts for power shovels and crushers made of Oro alloyed manganese steels. Also described in detail is the Quad-Edge renewable-tip pulverizer hammer which permits tips to be replaced when 50% worn instead of discarding the entire hammer.

TRENCH DIGGER—Parsons Co., Newton, Iowa. Bulletin describes the latest addition to the Parsons line of Trenchliners, the one-man utility-size rubber-tire-mounted Model 80 Trenchmobile, with details of its construction, features and application to varied small digging assignments.





THE LUBRICANTS FOR use in underground coal loaders must meet exacting requirements. The adverse operating conditions and long working hours demand lubricants of unusual stability aside from other characteristics. Cities Service products used here have reduced maintenance problems for a long list of mine operations.

THE RIGHT LUBRICANTS FOR this self-propelled coal cutter can make a substantial difference in performance. There are many remarkable examples of increased production obtained by using the right grade and type of lubricants on file at the numerous companies now using Cities Service top quality lubricants.

Free—A new booklet "Coal Mining Machinery Lubrication" is yours at no obligation. Write Sixty Wall Tower, Room 535. New York 5, N. Y.

CITIES SERVICE

Among the Manufacturers

MSA Honors Veteran Employees

GEORGE H. DEIKE, president and co-founder of Mine Safety Appliances Co., Pittsburgh, was one of the firm's 342 veteran employees honored at a service-award dinner Nov. 28. Mr. Deike (second from the left) is shown receiving the award for his 35-year service from John T. Ryan Jr., MSA executive vice president and son of Mr. Deike's original partner in founding the company in 1914. Three MSA employees with them, who have just completed 30 years' service with the company, are: J. B. Davies (left), manager of industrial sales; S. D. Price, chemist; and C. A. Wedge, plant engineer.

Leaston L. Howell has been elected a director and a vice president of the Acme-Hamilton Manufacturing Co., in charge of operations for its two Trenton plants, Hamilton Rubber Mfg. Co. and Acme Rubber Mfg. Corp. Mr. Howell, who has been with the Hamilton company for 32 years, recently has been vice president and factory manager in charge of production for that division.

Paul M. Arnall has been elected vice president and general manager of The Lunkenheimer Co., Cincinnati. Mr. Arnall was previously associated with the Graton & Knight Co. as assistant general sales manager, then joined with The Ohio Injector Co., for the past several years having been executive vice president and director.

Robert J. Binford Jr. has been named sales manager of the D-A Lubricant, Inc., Indianapolis. Mr. Binford joined D-A Lubricant in 1939 and has been a sales supervisor, working out of the factory, since the spring of 1948 and previously was service representative for the company in California.

Homer A. Goddard Jr., formerly assistant Pittsburgh division manager, has been named assistant general manager for industrial marketing for the Gulf Oil Corp., Pittsburgh, Pa., in charge of sales to industrial plants and organizations. Mr. Goddard, who served for several years in the operating end of the brick and coal-mining industries, previously was with Bethlehem Steel Corp. and Mine Safety Appliances Co., joining Gulf in 1932 as industrial lubrication engineer.

Link-Belt Co., Chicago, has appointed Eugene P. Berg, formerly general superintendent, to the newly created position of assistant general manager of its Pershing Road plant, Chicago, and has named Richard Moyer, formerly superintendent of the steel shop, general superintendent, manufacturing department. Mr. Berg first worked at the Pershing Road plant in 1929 during school vacations and Mr. Moyer joined the plant in 1937.

Joy Mfg. Co., Pittsburgh, has appointed Robert L. Frazer as a Joy representative in Spokane. A 1942 graduate of the Montana School of Mines, Mr. Frazer previously was an engineer with the Union Pacific Coal Co., Rock Springs, Wyo., Potash Co. of America, Carlsbad, N. M., and the Freeport Sulphur Co., Freeport, Texas.

General Electric Co. has announced the appointment of executives of its Apparatus Department to new positions, as follows: Neil Currie Jr., from manager of manufacturing to administrative assistant to the general manager; Ernest E. Johnson, from manager of engineering to manager of engineering, Large Apparatus Divisions; Carl A. Salmonsen, from manager, Aircraft Gas Turbine Divisions, to manager of manufacturing, Large Apparatus Divisions; Byron A. Case, from assistant to manager of engineering, Small Apparatus Divisions; Frank T. Lewis, from manager of manufacturing, Aeronautic and Ordnance Systems Divisions, to manager of manufacturing, Small Apparatus Divisions; Clarence H. Linder, from assistant manager of manufacturing to assistant to the general manager. D. S. MacDonald has been appointed assistant to the manager of the gear-motor sales division, General Electric's Small and Medium Motor Divisions.

Austin Goodyear has been appointed assistant to B. T. Moffatt, vice president in charge of sales for Hewitt-Robins, Inc., New York. Other appointments include C. A. Thompson as Charleston, W. Va., district sales manager and the transfer of C. W. Brooks, formerly representing the company in Northeastern Pennsylvania, to the firm's Virginia-North Carolina sales territory, handling both Hewitt Rubber Division and Robins Conveyors Division products.

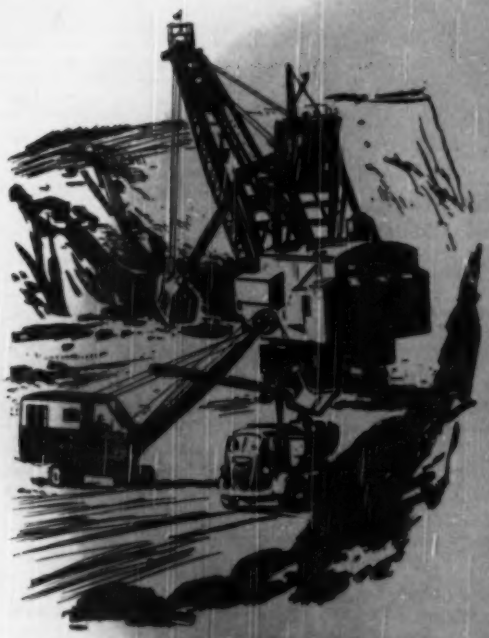
Cary Shoemaker, sales engineer, Industrial Division, Continental Gin Co., has been transferred from field sales, Birmingham, to Knoxville, Tenn., covering east Tennessee for conveying, elevating and power-transmission equipment.

Ralph Hanes has been named director of advertising and sales promotion for the Dodge Mfg. Corp., Mishawaka, Ind. Since 1942, Mr. Hanes has been sales promotion manager of the mechanical goods division, U. S. Rubber Co., where he was responsible for the advertising and sales promotion program of 11 sales departments and three sales subsidiaries. He also previously served as sales promotion manager for the New York Belting & Packing Co., Passaic, N. J.

Whitney Chain & Mfg. Co., Division of Whitney Hanson Industries, Inc., has recently moved to new and larger headquarters at 3317-25 W. Newport Ave., Chicago 18. The recently completed one-story building has 15,000 sq ft of floor space and offers modern facilities for customer service, including space for a large stock of the company's products.

Construction of National Tube Company's extensive new steel and pipe-making facilities at Lorain, Ohio, has been virtually completed, it recently was announced by John E. Goble, president of this United States Steel subsidiary. The project is reported to be one of the major additions to the American steel industry since the close of the war and of key importance in United States Steel's billion dollar coast-to-coast postwar im-

Today it's Roebling!



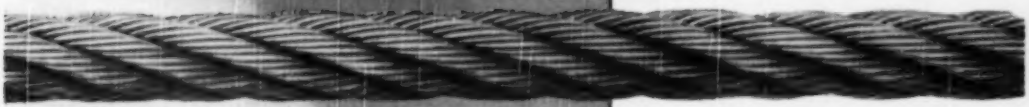
In strip mining, for shovel hoist and draglines, Roebling Preformed "Blue Center" Wire Rope with Independent Wire Rope Core is outstanding for small and medium size equipment . . . often preferred for 20- to 40-yard machines.

Why men who watch costs . . . specify Roebling Preformed

THE RECORDS PROVE IT . . . that Roebling Preformed "Blue Center" Wire Rope stays on the job longer and cuts your costs. This is partly because "Blue Center" steel—developed and made only by Roebling—has unsurpassed resistance to abrasion, shock and fatigue. In large measure, too, it is because of the painstaking care, special techniques and modern precision machines that guard and maintain Roebling quality leadership.

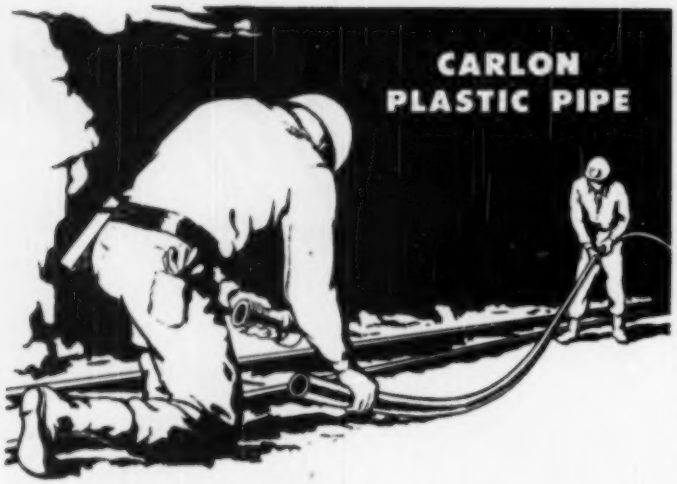
Preformed a big help, too. Wide experience in the field proves that Roebling *Preforming* brings still more operating economies. Preformed is easier and faster to handle and install. You can cut it without seizing. It winds better . . . is not apt to set or kink . . . minimizes vibration and whipping.

Today's best buy. Roebling makes wire rope of every construction, grade and size . . . engineered for top efficiency on every type and make of rope-rigged equipment. Have your Roebling Field Man recommend the *right* rope for best, low-cost performance on each installation. John A. Roebling's Sons Company, Trenton 2, N. J.



ROEBLING

Atlanta, 916 Avon Ave. • *Boston*, 31 Sleeper St. • *Chicago*, 5525 W. Roosevelt Road • *Cincinnati*, 3253 Fredonia Ave. • *Cleveland*, 701 St. Clair Ave., N. E. • *Denver*, 4801 Jackson St. • *Houston*, 6216 Navigation Blvd. • *Los Angeles*, 216 S. Alameda St. • *New York*, 19 Rector St. • *Philadelphia*, 12 S. Twelfth St. • *Portland*, 1032 N. W. 14th Ave. • *San Francisco*, 1740 Seventeenth St. • *Seattle*, 900 First Avenue S.



Corrosionproof
Light Weight
Flexible...

GUARANTEES LONG CORROSION-FREE SERVICE LIFE UNDER SEVEREST MINE OPERATING CONDITIONS

■ CARLON "E" utilizes the inherent properties of plastics to solve the mining industry's pipe corrosion problems. Extruded from a specially compounded plastic, CARLON "E" pipe withstands the effects of sulphurous water . . . alkalies . . . metallic salts . . . and it has a normal service life many times that of metal piping.

■ Light weight . . . Flexibility . . . Corrosion resistance . . . These remarkable features of plastic pipe will drastically reduce your installation, maintenance, and replacement costs. CARLON "E" curves to follow shaft direction, self-adjusts to uneven surfaces, and requires a minimum number of fittings.

■ Operational tests conducted by some of the country's leading mining companies have proven conclusively that CARLON "E" plastic pipe is easier to install (at lower cost) and that its service life is far greater than that of metallic pipe.

■ Check CARLON "E" specifications. Call upon Carter's engineers or field experts to help you with mine piping problems.

Specifications of CARLON "E" pipe

Standard Pipe Size	O. D.	I. D.	Calculated Bursting Pressure P. S. I.	Weight/ Ft.	Normal Shipping Lengths
1/2"	.840	.622	540 lbs.	0.10 lbs.	400 ft. coils
3/4"	1.050	.824	350 lbs.	0.14 lbs.	400 ft. coils
1"	1.310	1.070	200 lbs.	0.18 lbs.	300 ft. coils
1¼"	1.660	1.380	200 lbs.	0.27 lbs.	300 ft. coils
1½"	1.900	1.610	200 lbs.	0.32 lbs.	250 ft. coils
2"	2.378	2.070	170 lbs.	0.44 lbs.	200 ft. coils
3"	3.504	3.070	165 lbs.	0.91 lbs.	100 ft. coils
4"	4.504	4.030	150 lbs.	1.25 lbs.	25 ft. Str.
6"	6.630	6.070	115 lbs.	2.23 lbs.	25 ft. Str.

CARLON CP *Manufacturers of Extruded Plastics*

CARTER PRODUCTS CORPORATION

10223 MEECH AVENUE **CLEVELAND 5, OHIO**

provement and development program. Major units in the improvement program at Lorain are the world's first continuous seamless pipe mill; new blooming, bar, and billet mills; an entirely new Bessemer steel plant, 177 new by-product coke ovens, and a modern warehouse for pipe storage under roof. The new steelmaking facilities boost National Tube's rated output at Lorain to approximately 2,250,000 tons annually.

Schramm Inc., West Chester, Pa., is celebrating its 50th anniversary this year. Starting with a modest little machine shop in Philadelphia, Jan. 2, 1900, Chris D. Schramm, the founder, originally dedicated his business to servicing and selling gas engines. Schramm compressors now are built in a large, modern factory covering an area of 17 acres. In 1901, Henry N. Schramm, now president, joined his father at a time when electric ignition was being developed for gas engines and together they developed a make-and-break spark-ignition head. The first completely portable engine-driven compressor was developed in 1908, featuring interchangeability of parts, and since that time Schramm products have followed a consistent program of new ideas and improvements in compressor design.

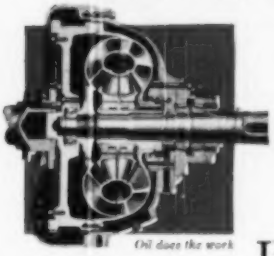
Weir Kilby Corp., Cincinnati, has announced the following appointments: Ralph F. Gordon, vice president-sales; M. J. Hassan, vice president-engineering; J. G. Kreis, vice president-purchases; and E. H. Schubert, vice president-operation. Ralph G. Detmer, formerly vice president, American Frog & Switch Co., has been named assistant to the president, sales and engineering.

Edwin H. Keiper has been named chief service engineer, Pennsylvania Crusher Co., Philadelphia. Associated with the company since 1919, Mr. Keiper has been chief design engineer since 1939.

The new research laboratory of the American Optical Co. in Stamford, Conn., was officially opened Nov. 30 with a meeting of the company's board of directors held there to symbolize "industry's interest in scientific research." The new facilities also were inspected by other company officials, industrialists from the Stamford area and others, including Sen. McMahon, Gen. Leslie R. Groves, Rep. John D. Lodge and Mayor George Barrett of Stamford. According to Dr. R. Bowling Barnes, vice president in charge of research, the new laboratory will supplement the research facilities and program of the company for "the development of new or improved scientific instruments involving optical principles and of new and improved lens of all types."

Metal & Thermit Corp., New York, has announced several new appointments; Bernard W. Weber, formerly manager of the Seattle plant of the

Smoother Starts
Heavier Pay Loads
Longer Clutch Life
Lower Fuel Costs



Oil does the work

with GM DIESEL TORQUE CONVERTER

INSTALLING a General Motors Series 71 Diesel engine torque converter unit in place of a gasoline engine in this 5-ton Vulcan locomotive, Leslie Salt Company, Newark, California, gained the advantages of Diesel economy—plus high torque *without gear shifting* to move heavy trains of salt cars from evaporation ponds to washing sheds.

With the original power and a selective 4-speed transmission, clutch life had been short. Now the operator can start most loads in fourth gear—and have the smoothness of hydraulic drive plus fast getaway because of the GM torque converter's 3.6 to 1 torque multiplication at start.

Gear shifting is virtually eliminated. The GM torque converter *automatically* shifts to fluid coupling as the train gets up speed, giving maximum efficiency throughout the load range.

This is just one of the many applications where General Motors Diesel engine torque converter units are proving their ability to get more work done at lower cost. Before you buy or repower equipment, it will pay you to look into the advantages GM Diesel can bring to your operation. Write for catalog covering full details on design, operation and application of the NEW General Motors Diesel engine torque converter unit.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

CLEAN GRADE BLEND **COAL** with *SYNTRON* Controlled **VIBRATION**

All Syntron Coal Handling Equipment — Vibrators, Feeders, Grizzlies, Screens, Picking Tables, Dewatering Screens, etc. — feature reactor control of vibration. Advantages are two-fold. They provide for instant and easy change of amplitude of vibration over a wide range to correspond with changes in the coal — assuring maximum efficiency for screens and grizzlies. Simultaneously they provide for control over the rate of flow — ideal when feeding to crushers, screens, and belts.

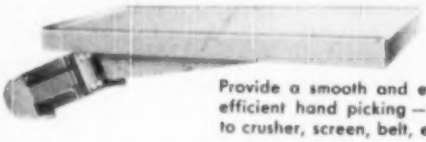
The control elements can be located on the operator's platform for quick, easy synchronization with other operating switches, meters, etc.

ELECTRIC VIBRATORS

Assure a steady flow from bins, hoppers, chutes.

VIBRATING GRIZZLIES

Provide a coarse sizing operation — plus a controlled feeding operation.



"Vibrating" PICKING TABLES

Provide a smooth and even flow of coal for efficient hand picking — plus controlled feed to crusher, screen, belt, etc.

VIBRATING SCREENS

Provide heavy tonnage sizing and feeding operations simultaneously.

LOW MAINTENANCE — LOW POWER CONSUMPTION

Write for Data

SYNTRON CO. 975 LEXINGTON AVE. HOMER CITY, PA.

American Can Co., appointed manager of the detinning and electrode manufacturing plant at East Chicago, Ind. W. S. Leinhardt, formerly general superintendent at East Chicago, has been named technical assistant to the vice president of production. William C. Cuntz, formerly manager of the company's office in Pittsburgh, has been made district manager at Chicago. He is succeeded in Pittsburgh by Orville T. Barnett, formerly manager of the Newark, N. J., office.

Stoody Co., Whittier, Calif., has advanced Charles E. Rogers to sales metallurgist. For the past three years, Mr. Rogers has been in charge of the metallurgical laboratory. Paul Irish, formerly associated with the Bethlehem Steel Corp. and Pacific Car & Foundry, has joined the company as plant metallurgist.

William J. McQuillan has been promoted to branch manager, Pittsburgh office, Morse Chain Co., Division of Borg-Warner Corp. Prior to joining the company in 1948, Mr. McQuillan was associated with H. H. Robertson Co. and Blaw-Knox Co.

Albert G. Crockett has been named manager of distributor sales for Mack-International Motor Truck Corp., New York, heading up Mack's domestic and Canadian wholesale organization of some 500 distributors. Mr. Crockett joined the company in 1927 and has been director of the market research department since the war.

Ward Leonard Electric Co., Mt. Vernon, N. Y., has established a St. Louis branch office at 4030 Chouteau Ave., with Charles B. Durling Jr., district manager, in charge. The company also has announced that its representative, Storer & Schemm, Cincinnati, has changed its name to Sheldon Storer & Associates.

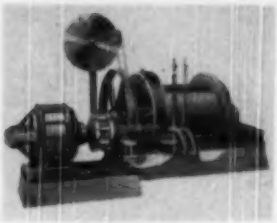
American Brake Shoe Co. has appointed William C. Bruton Pacific Northwest district sales manager for the American Manganese Steel Division, and Robert H. Elem Pacific Coast manager of the Welding Products department. William J. Grant has been appointed manager, southern sales for the National Bearing Division.

Chain Belt Co., Milwaukee, has appointed Russell G. Davis a sales executive of the company.

Richard Graybill, formerly New York manager, has been promoted to manager of The General Tire & Rubber Co.'s Philadelphia branch, succeeding R. F. Blundin, resigned. Mr. Graybill will direct General Tire sales for Pennsylvania, Delaware, Maryland, District of Columbia and the northern parts of Virginia and West Virginia.

Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, Ohio, has transferred Wayne H. Hunter to St. Louis as territory representative.

MAN CAGES



ELECTRIC HAULAGE

ELECTRIC and STEAM HOISTS

SELF-DUMPING CAGES

Lepley MINE EQUIPMENT

DESIGNED to *reduce* MAINTENANCE and OPERATING COSTS

SHEAVES

Nearly fifty years of service and development have made Lepley Mine Equipment a by-word in mining economy. Noted for long, trouble-free, rugged service, Lepley Mine Equipment is "tailor-made" to suit your individual problems. Check these: Lepley Man Cages that haul from 1 to 90 men per cage . . . Bottom Discharge Skips from 1 to 25 ton capacity . . . Rotary Dumps that handle one type car or a combination of types one or more at a time.

For nearly half a century, safety has been our goal. Lepley cages, skips and hoists are equipped with latest, patented safety devices. In actual tests on shaft and slope installations, Lepley Cages and Skips have been stopped in less than 6 inches, free-running. SAFETY and SERVICE are basic in Lepley designs . . . your guarantee of safe, long, and profitable mining operations.

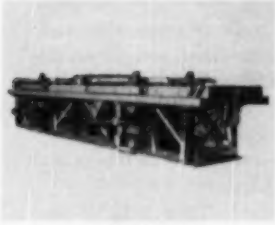
BOTTOM DISCHARGE SKIPS

We also manufacture:
ROTARY DUMPS . . . SUPPLY AND EXHAUST FANS . . . COAL AND SLATE LARRIES . . . ALL TYPES OF CONVEYORS . . . COKE OVEN EQUIPMENT.

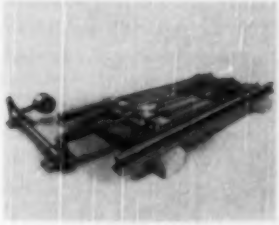
We shall be pleased to show you, without obligation, why Lepley Mine Equipment is today's finest. Call or write . . . .

CONNELLSVILLE
MANUFACTURING & MINE SUPPLY CO
CONNELLSVILLE, PA.

SKIP LOADING CHUTES

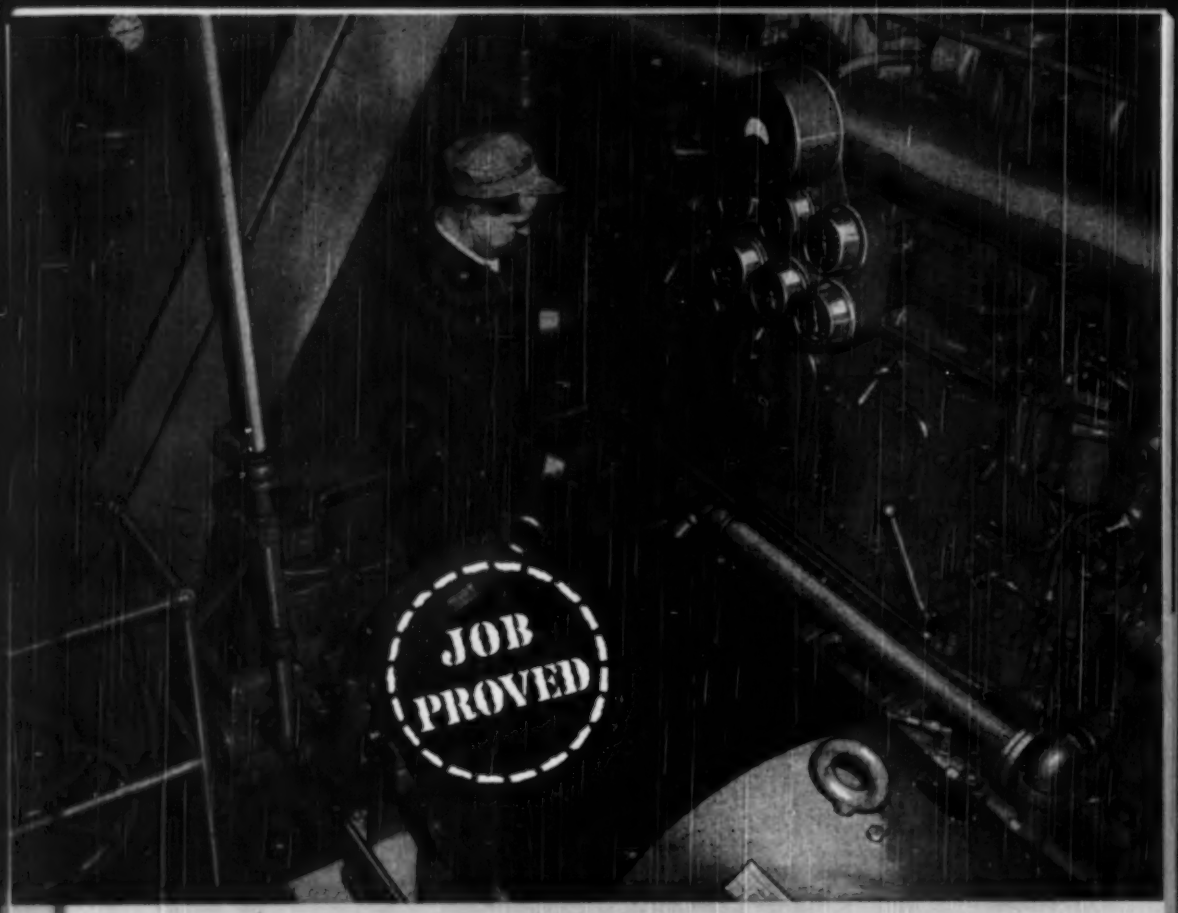


CAR CAGERS



RAIL SQUEEZERS

"SERVING THE MINING INDUSTRY SINCE 1901"



SUNVIS OIL PROTECTS BIG DRAGLINE

Diesel Operates 24 Hours a Day for 6 Months, Engine Free of Sludge and Carbon

A coal company operating a $160,000 diesel-powered dragline shovel in strip mining operations selected an oil of the Sunvis 700 H.D. Series to lubricate the engine from the very first day. This heavy-duty detergent oil was chosen on the strength of its "Job Proved" performance in the industry.

In six months of use, the shovel has worked round the clock with no need for repairs traceable to lubrication. A recent inspection showed the engine to be free from sludge and carbon and as clean as the day it was put in operation. Steady, peak production has made the owners enthusiastic about this top-notch lubricant.

Sun "Job Proved" Products are widely used throughout the quarrying and coal mining industries, and everywhere they are establishing similar fine records.

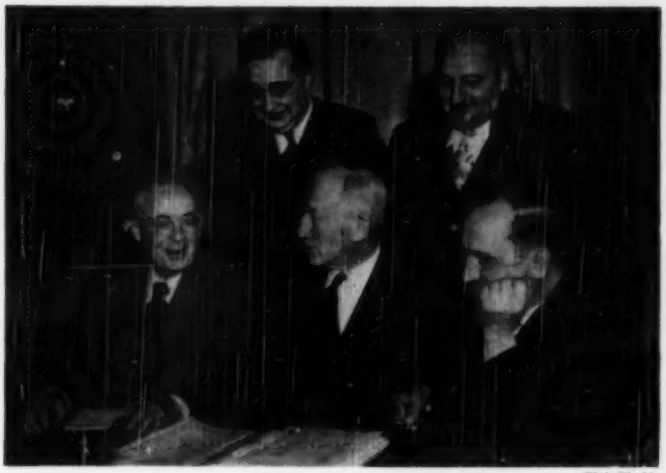
A Sun representative will be glad to give you detailed recommendations as to the correct oils and greases you need to protect all your production, transportation and preparation equipment. The making of a complete survey will not obligate you in any way. Call or write the nearest Sun Office.

SUN OIL COMPANY · *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY

SUNOCO



Wide World

AT REOPENING OF ANTHRACITE WAGE TALKS, top negotiators included: Thomas Kennedy (seated, left), UMWA vice president and head of its delegation; Ralph E. Taggart, president, P. & R., and chairman of the operators' group; Martin F. Brennan, president, District 7, UMWA; Edward Griffith (standing, left), president, Glen Alden Coal Co.; and Joseph Kershetsky, president, District 9, UMWA.

Bituminous Fight Continues As Anthracite Talks Resume

ALL MINES IN THE COUNTRY, both anthracite and bituminous, began a three-day work week Dec. 5 on union orders, as John L. Lewis began a widespread concerted effort to divide the ranks of bituminous operators and sign individual wage contracts on his own terms. The union decree came Dec. 1 as bituminous miners east of the Mississippi stopped work at the end of the three-week truce that had permitted a full work week. Anthracite talks were reopened in New York Dec. 6, but after more than two weeks of discussion there was no indication that a contract was imminent although "some progress" was reported at several sessions.

Definite demands on the part of the mineworkers were revealed for the first time since negotiations began last spring, when Mr. Lewis Dec. 6 announced the terms on which he would make contracts with individual operators. The price, he said in effect, was: an increase of 15c a ton in the welfare fund contribution to 35c; an increase of 95c from the present basic daily wage rate of $14.05; and establishment of a new board of trustees for the Welfare and Retirement Fund. The contract was to be effective Jan. 1 and would expire Sept. 1, 1951. Trustees named, in addition to Mr. Lewis, were Miss Josephine Roche, present director of the fund, as neutral trustee; and H. D. Showalter, president, Monongahela Rail & River Coal Corp., as the operators' representative. Mr. Showalter immediately stated that he had had no advance notice of the appointment and has not been reported as accepting it.

The union's demands on the anthracite operators were reported four days after the start of negotiations by Ralph E. Taggart, president, P. & R., and chairman of the operators' group. The union, he said, was asking that the welfare contribution be doubled to 40c a ton, together with an increase in the basic daily wage rate of 95c. A higher welfare rate than for bituminous mines was being asked of the anthracite group because of the lower output per man-day, it was reported. The anthracite negotiators repeatedly had asked that the mines return to the full work week during the talks, citing market losses that could not be made up. Union representatives consistently refused the request and at one point, Thomas Kennedy, UMWA vice president, stated that in order to hasten negotiations, "We had to choose between two alternatives—a complete stoppage or a three-day week." He proposed that any agreement made run through two winters, at least beyond April 1, 1951.

According to all reports available up to Dec. 22, three weeks after Mr. Lewis announced his policy of negotiating individual bituminous contracts, none of the producers associated with the two major negotiating groups had taken advantage of his offer. By mid-December, the union had announced that operators representing an annual output of 11,000,000 tons had signed, but names of the signatories were not released. With the exception of one large independent operator whose signing was not confirmed, it was thought that only small or marginal operators were accepting it.

Payments to the welfare fund due on Dec. 20 were reportedly being made by the majority of bituminous operators, after members of the northern and western negotiation group, meeting in Pittsburgh Dec. 16, voted to continue payments. Many prominent industry officials had been reported as favoring withholding payments to force a definite stoppage Jan. 1 and thus bring on government action on the basis of the "emergency" that would result. The possibility that Mr. Lewis would nevertheless close down the mines com-

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pletely after the holidays was not being discounted.

In a 2,500-word letter to Pres. Truman, Joseph E. Moody, president, Southern Coal Producers' Association, asked the President to intervene in the dispute. Citing the loss to the public, Mr. Moody asked him to bring an end to the "existing crisis" by invoking the Taft-Hartley Act and having the Attorney General investigate the possibilities of an anti-trust action against Mr. Lewis. If there were no basis for anti-trust action under present laws, the President should ask Congress to make the union subject to them, he suggested.

The negotiations had shown, Mr. Moody said, that "Mr. Lewis intends to continue to rely upon the immunity of his union from anti-trust prosecution to enforce his will upon the industry." There is no doubt that the government would have proceeded against the operators if they had imposed a three-day week, he maintained. "Why then should our giant unions be exempted when they take similar action?" he asked. President Truman made no reply to the letter, his aides reporting that it was not his policy to reply to letters made public. It was understood, however, that the letter was not made public by the Southern group until it had leaked to the press from other sources.

Former Judge Charles I. Dawson, appointed operators' trustee for the UMWA Welfare and Retirement Fund Nov. 3, petitioned the Federal District Court in Washington, D. C., Dec. 19 for a mandatory injunction that would force Mr. Lewis to permit him to take his place on the fund's board. At the two meetings held after his appointment, Nov. 21 and Dec. 2, he said, Mr. Lewis refused to recognize him as a trustee. At the first meeting, it was understood that Mr. Lewis maintained that Mr. Van Horn had not submitted his resignation to the trustees and that he had not received "clearance" from the courts. At the second meeting, Mr. Lewis was reported as saying that he considered that the contract had been extended and that therefore Judge Dawson's appointment was valid. However, Mr. Lewis said, Sen. Bridges did not agree that the contract had been extended and therefore, Mr. Lewis continued, he could not accept him. Sen. Bridges is reported as favoring the acceptance of Judge Dawson.

•

Pocahontas Fuel To Market Oil

Citing loss of customers as the result of the undependability of coal supplies, the Pocahontas Fuel Co., Inc., last month announced that it was joining with the California Oil Co., a subsidiary of the Standard Oil Co. of California, to construct at Portland the "largest oil terminal in the state of Maine," so that it would be able to provide its customers with either coal or oil, whichever is cheaper and available.

Work will be started immediately by the joint company, which will be known as the Pocahontas Terminal Co. The first two tanks, with a total capacity of 100,000 to 125,000 bbl, are expected to be completed by May, although the terminal may not be in operation until fall. Plans call for the eventual enlargement to five or six storage tanks and the plant will be equipped to unload the largest-type tankers. Cost of the project was reported at $1,000,000.

In announcing his company's plans, O. L. Alexander, Pocahontas president, said: "The simple fact is that our customers are so thoroughly disgusted with interruption year after

THIS MONTH'S COVER shows two of the five new boilers in operation at the Pittsburgh (Pa.) Works of the Jones & Laughlin Steel Corp. Typical of modern coal-burning installations, the new boiler plant not only provides steam at greater efficiency but works toward further elimination of smoke in cooperation with Pittsburgh's smoke-control program. For the story of how strikes and short work weeks are affecting coal's large consumers and its future markets—and what mining men should do—be sure to read "What's Ahead for Coal?"—starting on p. 54.

COMING IN FEBRUARY—Top feature will be the annual up-to-the-minute staff-written analysis of the industry's progress in 1949 and its prospects in 1950, covering such factors as new mining machinery and methods, markets, research and labor relations—plus the Bureau of Mines statistical reports of loader and cleaner sales and safety progress. In addition, you'll find the usual helpful technical articles, including descriptions of a new highly flexible Indiana washery, an anthracite fan and airshaft installation, core-drilling an airshaft and modern belt-conveyor controls.

NO CABLE LIKE IT!

SECURITYFLEX
PARALLEL MINE CABLE
with BREAKER-STRIP*

SECURITYFLEX *Safety Firsts*

- *First* to comply with U. S. Bureau of Mines Flame Test and Pennsylvania Flame Test. (Insist on mark of *full compliance*—P-102-BM—at 12' intervals.)
- *First* and *only* Anti-Short Breaker Strip* construction — cuts short circuits between conductors.
- *First* parallel mine cable with ground wire.
- *First* and *only* D-Shaped* insulation — prevents overriding of conductors.
- *First* to have insulation and outer jacket bonded together — to form a *solid block* around conductors.
- *First* with smaller diameters that pack more on a reel, ease handling.

*Reg. U. S. Pat. Off.

THE PATENTED anti-short breaker-strip construction of Securityflex Parallel Mine Cable is an exclusive development of Anaconda Wire & Cable Company. No other mine cable gives you this protection against shorts between conductors, even under the heaviest impact.

Breaker-Strip (available with or without ground wire) is only one of the many Securityflex features. Add up the advantages of Anaconda's specially compounded, extra tough neoprene jacket . . . non-kinking construction . . . improved heat-resisting synthetic rubber insulation . . . superior manufacturing techniques . . . the *Safety Firsts*.

Call your local Anaconda distributor (located in all principal cities) about Securityflex—the cable that takes a beating *and likes it!* Anaconda Wire & Cable Company, 25 Broadway, New York 4, N.Y.

ANACONDA *Securityflex* **MINE CABLE** ANACONDA

MARKING THE 50th ANNIVERSARY of the founding of first-aid training, Edward N. Stuart (left) and James O'Dowd, two of the three surviving members of the first first-aid class in America, and Edison Thomas (right), superintendent, Marvine colliery, The Hudson Coal Co., and chairman of the celebration, lay a wreath at the monument in Jermyn, Pa. A parade and a banquet also were part of the celebration.

First-Aid Pioneers Honored at Jermyn

Commemorating the 50th anniversary of the founding of first aid, the community of Jermyn, Pa., in cooperation with The Hudson Coal Co., United Mine Workers officials, the local Red Cross organization, and representatives of the state inspection service and the U. S. Bureau of Mines, set aside the week of Dec. 12-17 to honor Dr. Matthew J. Shields and the members of the first organized first-aid group in the United States. The week also was set aside by the governor of Pennsylvania as "First-Aid and Accident-Prevention Week" in honor of the occasion. Climax of the celebration was a parade and ceremony at the memorial monument followed by a dinner at the Jermyn High School auditorium attended by surviving members of the original group and members of Dr. Shields' family.

Recognizing the need for better care of the injured, 25 men at Jermyn No. 1 colliery, later taken over by The Hudson Coal Co., organized to take first aid with Dr. Shields as instructor on Oct. 25, 1899. Special trophies and state first-aid certificates were awarded the survivors—James O'Dowd, Edward N. Stuart and Peter Kelly—at the dinner, also attended by Dr. Shields' son, Henry; granddaughter, Margaret; daughter, Mrs. George Rose; Mr. Rose; and grandson, George Rose, Jr.

The trophies and certificates were presented by Richard Maize, Pennsylvania Secretary of Mines. For those unable to be present, acceptances were made by Mrs. Richard Marion, daughter, for Mr. Kelly, and by Floyd Battenberg, Jermyn burgess, for Mr. O'Dowd. Mr. Battenberg also accepted for the family of William Tennis, who died the week preceding the memorial period.

Speakers at the dinner included Mr. Maize; E. H. McCleary, U. S. Bureau of Mines; and Dr. Carl Pothoff, American Red Cross. The Hon. M. J. Eagen was toastmaster, and was introduced by Edison Thomas, superintendent, Marvine colliery, The Hudson Coal Co., and chairman of the committee on arrangements. Honored guests included Edgar C. Weichel, vice president, Hudson Coal; Dean Edward Steidle, School of Mineral Industries, Pennsylvania State College; and Ivan A. Given, editor, *Coal Age*. Frank D. Shoemaker, general manager, Penn Anthracite Collieries Co., and Fred F. Gilbert, The Hudson Coal Co., were vice chairmen of the committee on arrangements. Mr. Battenberg was treasurer and Earl W. Kase was secretary.

In addition to entertainment, the dinner program included a first-aid demonstration by teams representing the northern independent operators and the Coal Brook colliery of The Hudson Coal Co. Both teams were trained by Ambrose Castner, safety engineer, Northwest Coal Co.

year in their coal supply because of Mr. Lewis' attitude that we are going into oil where oil is available in order to hold on to our business. It is up to us to be able to offer our customers either coal or oil, whichever is cheaper," he added, "with the thought that some day oil may go out the window and coal may come back into its own."

Personal Notes

Reassignment of duties in the operating management of the Coal Division, Eastern Gas & Fuel Associates, has been announced by L. C. Campbell, vice president. **M. Albert Evans**, assistant to the vice president, is in charge of the operation of the 19 mines, which will continue on the present six-group basis of organization. Three new division offices have been created with two groups of mines in each, which are headed by a division manager assisted by general superintendents and individual mine superintendents. **H. John Harper**, assistant to the vice president, has assumed general duties as assistant to Mr. Campbell.

The three new mining divisions, their headquarters, managers and mines included, are as follows:

Low-Volatile Division, Bluefield, W. Va.: **M. L. Workman**, formerly general superintendent, McDowell County mines, manager for Helen, Stotesbury and Eccles mines in Raleigh County, W. Va., and Keystone, Carswell and Maitland mines in McDowell County.

High-Volatile Division, Beckley, W. Va.: **A. P. Boxley**, formerly general superintendent of Kopperston, Wharton and Weeksbury mines, manager for Kopperston mines in Wyoming County, W. Va., Wharton mines in Boone County, W. Va., Weeksbury mine in Kentucky, and Powellton, Beards Fork and Midvale mines in Fayette County, W. Va.

Northern Division, Grant Town, W. Va.: **H. A. Quenon**, formerly general superintendent, Federal No. 1 mine, manager for Federal No. 1 mine, Melcroft and Sonman mines in Pennsylvania.

In the low-volatile division, Mr. Workman has appointed **S. H. Thatcher**, general superintendent of the Raleigh County mines, to the same position for the McDowell County mines, with headquarters at Kimball. **W. D. Hawley**, superintendent, Helen mines has been named to succeed Mr. Thatcher as general superintendent of all Raleigh County mines. **Joseph H. Benedict**, resident engineer at Helen No. 9 and Stotesbury No. 11 mines, has been appointed to succeed Mr. Hawley as superintendent at Helen, and has been replaced by **Squire R. Barrett**, previously mining engineer at Eccles mines.

A. B. Crichton Jr. and W. D. Hughes have been elected vice presidents, and **E. M. Ellenberger** assistant secretary-treasurer of the Johnstown Coal & Coke Co., according to an announcement by Andrew B. Crichton, Sr., president. Mr. Crichton, who joined the company in 1933 in the engineering department and has served as superintendent of various of its properties, most recently has been assistant

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia Danville, West Virginia — Canton, Ohio — Birmingham, Alabama Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas New Castle, England — Alberta, Canada

BOWDIL CANTON OHIO
COAL CUTTING EQUIPMENT

to the president dealing with operating and mechanization matters. In his new position, he will function as the top operating official of the company, supervising mines in West Virginia, Maryland and Pennsylvania. Mr. Hughes, previously general manager, has been with the company since 1915 and has been connected with operation of the company's mines at Portage, Pa., for many years. He also has assisted Mr. Crichton Sr. in engineering studies involving examination and reports on coal properties in most of the coal fields of the United States. In his new capacity, Mr. Hughes will be responsible for all engineering, real estate and construction activities of the company. Officers of the company re-elected at the recent directors' meeting include: **John W. Walters**, chairman of the board; **Andrew B. Crichton Sr.**, president; **Harry A. Crichton** and **Walter G. Crichton**, vice presidents; **C. N. Crichton**, secretary-treasurer; **John E. Evans**, general counsel; and **Martha C. Curry**, assistant treasurer.

Walter Jaap, superintendent, Lindley mine, Pittsburgh Coal Co., has been appointed superintendent, Montour No. 4 mine, to succeed **Frank Strimlan**, resigned. **Richard Meute**, mine foreman at Lindley, has been named superintendent to replace Mr. Jaap. **Joseph Patellos**, formerly mine safety inspector, Mathies division, has been made mine foreman at Lindley.

West Virginia Coal & Coke Corp. has announced several changes in supervisory personnel. **T. H. Childers**, superintendent, Mine No. 15, has been transferred to superintendent, Mines Nos. 19, 19-L and 19-C. **Edward W. Bays**, with the company since 1924 in various capacities and most recently as mine foreman at No. 15, has been named superintendent, Mine No. 15, to succeed Mr. Childers. He has been succeeded as mine foreman by **William R. Lawson**, formerly night foreman. **Green W. Conley** has been promoted from foreman to night foreman to succeed Mr. Lawson. **Ed Ferry**, formerly employed by the Blue Diamond Coal Co. and the Crystal Block Coal Co. and who joined the company last June, has been appointed assistant superintendent, Mine No. 19.

Henry F. DeBardeleben has been elected chairman of the board of directors, and **Newton H. DeBardeleben**, president, DeBardeleben Coal Corp., Birmingham, Ala.

D. C. Ridenour has joined the Olga Coal Co., Coalwood, W. Va., as mining engineer and is now working primarily on the installation and operation of new mining equipment being purchased by the company, according to H. E. Mauck, general superintendent. Mr. Ridenour formerly was division engineer, Pittsburgh Coal Co., joining that company on his graduation from Ohio State University in 1939. **E. J. Servant**, formerly maintenance superintendent, Truax-Traer Coal Co., has joined Olga Coal as mechanical engineer and will supervise maintenance of underground equipment at the company's three mines. A graduate of the University of Pittsburgh, Mr. Servant was employed by the Pittsburgh Coal Co., before joining Truax-Traer in 1948.

J. W. Woomer, J. W. Woomer & Associates, Pittsburgh, Pa., and Wheeling, W. Va., recently returned from a four weeks' trip to Australia, during which he inspected steel-company mines in eastern Australia and examined virgin coal available in western Australia for use in a steel plant under consideration in that state. Mr. Woomer made the entire trip by air, leaving from San Francisco and returning from Western Australia via India, Egypt, Rome and London.

Donald R. McCaa has resigned as safety director, Freebrook Corp., Kittanning, Pa., to join the Mine Safety Appliances Co. as sales engineer in central Pennsylvania.

Hewitt Wilson has been appointed regional director, Region 7, U. S. Bureau of Mines, succeeding J. Bruce Clemmer, who served as director during an interim period and who is returning to his former work in Tucson, Ariz. With Mr. Wilson's appointment, headquarters of the region has been transferred from Tuscaloosa, Ala., to Norris, Tenn. Mr. Wilson has been head of the Norris station since its establishment in 1938.

Shefton Gordon has been advanced to general mine foreman, King mine, U. S. Fuel Co., Hiawatha, Utah. Mr. Gordon first went to work at King mine in 1927 and has been mine foreman since 1945.

The Hudson Coal Co., Scranton, Pa., has transferred **Thomas Davies**, formerly inside mine foreman, Marvine No. 1 shaft, Marvine colliery, to the same position at the Gravity Slope colliery, succeeding **Thomas L. Morgan**, deceased. **Warren L. Shirey**, ventilation supervisor, succeeds Mr. Davis at Marvine, and **William B. Roth**, of the company's student corps, replaces him as ventilation supervisor. **Patrick Dougherty**, inside foreman, Loree No. 3 colliery, has been transferred to the same position at Coal Brook colliery, succeeding **William Morcom**, deceased. **Ervin L. Conner**, assistant on machine mining, has become inside foreman at Loree No. 3. **Frederick C. Rorick**, has been made assistant on machine mining to replace Mr. Conner. **Richard E. Weichert**, of the company's student corps, has been appointed fireboss at Delaware colliery, succeeding Mr. Rorick.

Raymond L. Grant recently retired as engineer in the real estate department of the company, after 41 years of service. He joined Hudson Coal in November, 1908, as a surveyor.

Clyde B. White, chief engineer, Clover Splint mine, Consolidation Coal Co. (Ky.), retired Oct. 1 after many years in mining that included supervisory positions at both coal and metal mining operations. **James Wilson**, his assistant, has been promoted to mining engineer at Clover Splint.

Elmer Layne, Pikeville, and **Wallace E. Warren**, Morton's Gap, have been appointed Kentucky state mine inspectors.

●

1949 COAL AGE INDEX

THE ANNUAL COAL AGE INDEX, Volume 54, January to December, 1949, is now being prepared and will be available within several weeks to any subscriber on request, without charge. Address: Editorial Dept., COAL AGE, 330 W. 42 St., New York 18.

Obituaries

Denver B. Cornett, 66, president, Cornett-Lewis Coal Co., Louellen, Ky., died Nov. 23 at the Kentucky Baptist Hospital, Louisville, Ky., following admittance to the hospital several days earlier. Mr. Cornett had been in ill health for several years. He founded the Cornett-Lewis Coal Co. in 1918 and had been active in the industry for many years. He served on the National Bituminous Coal Commission during the first World War and again in 1937. He was a member and a past president of the Harlan County Coal Operators' Association.

O. H. Viall, 80, Barbourville, Ky., died Nov. 26 in the Barbourville hospital following a heart attack suffered two days previously. Mr. Viall, who had extensive coal and lumber holdings in Kentucky, last summer purchased the Pioneer Coal Co. and planned to use the worked-out properties for access to large coal holdings lying adjacent to them.

Charles R. Wentz, 75, associated with the Stonega Coke & Coal Co., Stonega, Va., for 55 years, died Nov. 29 in Philadelphia.

James N. Meek, 79, Eastern Kentucky coal operator, died Nov. 16 at his home in Paintsville, Ky., following a heart attack.

Richard James Sr., 68, general manager, James Bros. Coal Co., Magnolia, Ohio, died Nov. 28 at home in Magnolia following a heart attack.

Alex Bryce, 65, for the past 12 years West Virginia state mine inspector, died Nov. 29 at his home in Westover, W. Va. Before joining the state, Mr. Bryce was superintendent of the Kellys Creek Collieries Co. mine near Morgantown for eight years and also held supervisory positions with other companies.

Top producer of them all . . . *McCarthy Drills*

Hundreds of successful operators rely on McCarthy Drills for their really tough jobs, because they know McCarthy Drills produce more footage at less cost in less time! These rugged machines have proved themselves in every test under the most difficult conditions. List of owners furnished on request.

SELF-PROPELLED HORIZONTAL DRILL

These tough, maneuverable units produce 40% more 6 to 8-inch blasting holes per day as they move about under their own power from hole to hole in the pit. The hydraulically controlled carriage travels a distance of seven feet, eight inches to provide ample clearance for the addition of six-foot auger extensions. Drills holes up to a horizontal depth of 120 feet. Finger tip control permits selection of any drilling speed up to six feet per minute and four individual self-locking jacks maintain correct drilling level during operation. Over-all length: 12 feet. Width: 5 feet, 8 inches.

VERTICAL DRILL

Here's a real time-saver for blast hole drilling of 6 and 8-inch holes practically designed for truck, half-track or caterpillar tractor mounting. The eight-foot tower is raised and lowered by hydraulic power and, when in traveling position, its over-all height is only seven feet, four inches. The auger is driven by an alloy shaft connected by a flexible chain coupling. The upper shaft section is 2½ inches square and drives through a lubricated sleeve located on top of the tower. Total weight: 4800 pounds.

COAL RECOVERY DRILL

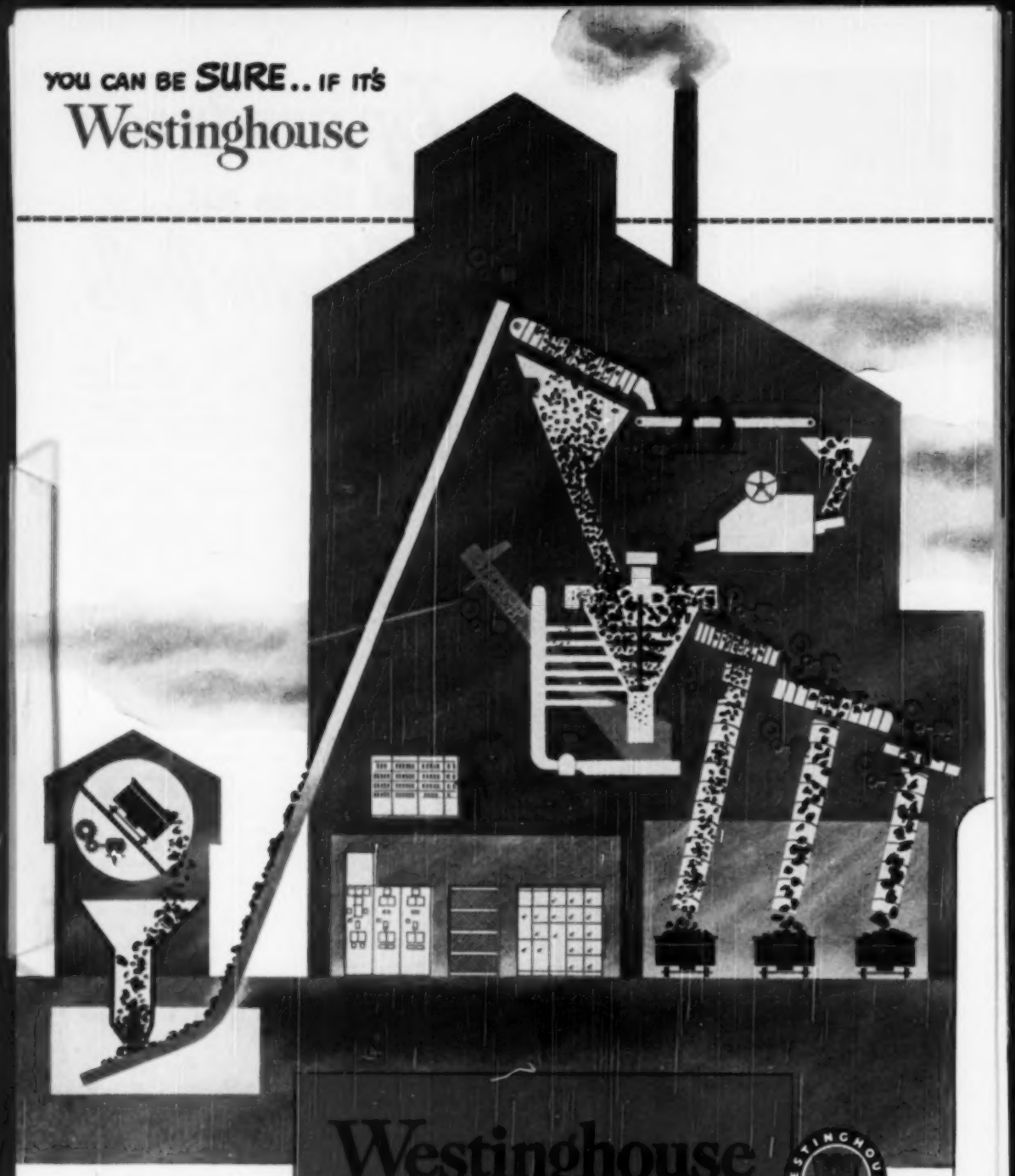
This machine is specifically built for recovering coal after further strip mining is unprofitable. A three-man crew can easily drill to depths of 100 feet or more. With 16, 20, 24, 30, 36 or 40-inch augers, a McCarthy Drill will produce from 60 to 150 tons of clean coal every eight hours for a total cost, including depreciation, of less than $1.50 per ton! A special steel-geared reduction unit, running in oil on Timken Bearings, transmits power through the heavy-duty transmission. Four speeds forward, one reverse are provided and the carriage travels a distance of eight feet. Over-all dimensions: 6 feet by 14 feet long. Total weight: 4700 to 5000 pounds. See your McCarthy Dealer today or write us direct for information.

Six-cylinder gasoline engine standard on all drills. Diesel or electric power units can also be supplied.

Manufactured by

The SALEM TOOL Co.
763 S. ELLSWORTH AVE., SALEM, OHIO, U. S. A.

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



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EQUIPMENT FOR
THE MINING INDUSTRY

Here's Proven Electrical Apparatus

TO HELP YOU CLEAN COAL AT LOWER COST

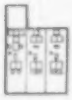
Figure it on a tonnage basis. When the electrical apparatus is right, your Preparation Plant runs more efficiently—turns out more coal for each kilowatthour you pay for. There are fewer outages—you get more tons per man-hour of labor. Equipment needs less maintenance—more coal is cleaned per dollar spent on repair.

Make sure the apparatus you buy will be right for your plant. Check it on these two points: 1. Has the equipment been proved in Preparation Plant service? 2. Will it be engineered into a *co-ordinated* system to meet your *particular requirements?*

When Westinghouse supplies the equipment, you get a Yes on both counts. We've handled the complete electrical requirements for a great many Preparation Plants—including the world's largest. Westinghouse apparatus has been thoroughly proved in service. And our Mining Industry Engineers know how to help co-ordinate equipment into an efficient, low-maintenance operation. From the planning stage on, they work with you and your machinery builders.

When you build a new plant, rebuild or add on to your present operation, let us help. You'll get a plant that cleans more coal at lower cost. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

SYMBOLS SHOW TYPICAL PLANT APPARATUS



Power Center, high voltage—Main power inlet containing high-voltage switchgear. Supplies the ASL Transformer and high-voltage motors. Required number of metal-clad cubicles are combined in one unit.

ASL Air-Cooled Transformer—Mounted between Power and Control Centers. This saves space, wiring. Safety's high, too; internal buses, wiring troughs are used. Most important, there's no liquid to burn or explode.

Control Center, low voltage—Takes low-voltage power from ASL Transformer. Contains switchgear, starters, relays for all low-voltage motors; each unit in its own cubicle Highly compact but flexible arrangement.

Pushbutton Control Station—Here, one man can control every driven operation in the plant. Interlocks provide sequence-motor-starting, when desired. Mounting is flexible, designed to meet your requirements.

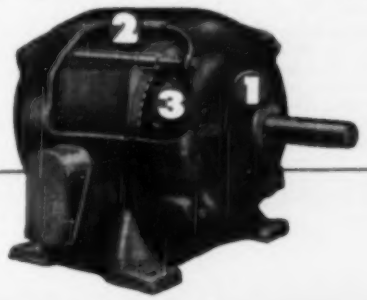
Speed Reducers, Gearmotors—Westinghouse makes a full line. For any application, you get the required drive speed at the most efficient motor speed. Gear teeth get the exclusive BP Taper-Hardened treatment.

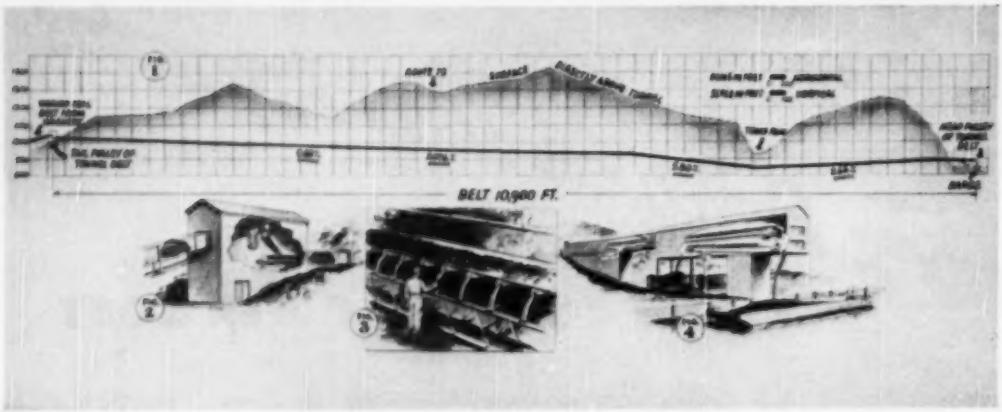
Life-Line Motors Cut Outages 50%; Save $7.50 Per Motor Per Year

An independent survey of all motor types showed that the new Westinghouse Life-Line Motors have 41% fewer bearing failures per year, cut outages from all sources in half and, all told, save $7.50 a year per motor. They're especially suitable for many Preparation Plant applications.

1. **No Lubrication Needed**—Bearings are pre-lubricated and factory-sealed. Coal dust can't get in. There's no lubrication problem for inaccessible motors.
2. **Stronger Mechanically**—Life-Lines are all *steel.* They're rugged. Working parts are far better protected against shock.
3. **Stronger Electrically**—Six layers of patented Tuffernell insulation protect the Tufvar windings, give you maximum insulation strength.

J-94807





RECENTLY INSTALLED at the new Weirton mine, this 10,900-ft belt conveyor will haul clean coal from the washery (left) to a barge-loading terminal on the Monongahela River (right), setting a new record as the . . .

World's Longest Single Conveyor Belt

THE WORLD'S longest single conveyor belt, a 30-in unit on 10,900-ft centers, designed to handle 250 tons of coal per hr at a speed of 300 fpm, recently was installed and was expected to be in operation at the end of 1949 at the new Weirton mine of the Weirton Steel Co., near Morgantown, W. Va.

Built and installed by the Mechanical Goods Division of the Goodyear Tire & Rubber Co., the Compass-150-Steel Cord belt will haul coal from the washery near the mine through a tunnel to a tipple on the Monongahela River for loading into barges. The former record for any-type belt was set by Goodyear on the Grand Coulee dam project 10 years ago, with a belt 4,985 ft long.

Weighing approximately 122 tons, the endless belt is more than 22,000 ft long and consumed 152,798 lb of rubber, 50,941 lb of cotton and 39,754 lb of steel cable. Coal dropped on the belt at the washery end will dump into a waiting barge on the river 36 min later. The conveyor has a vertical drop of approximately 135 ft and will be driven by a 200-hp motor.

Installation of a single belt was decided on to eliminate the hazards and added operating costs of transfer points, it was reported. Rail haulage also was considered, it was said. One factor in the installation was the impossibility of providing space for any take-up arrangement that would accommodate more than about 40 ft of belt. The take-up required for the entire 22,000-ft length of Goodyear Steel Cord belt will not be more than about 25 ft, according to the manufacturer. First production from the new mine is expected early this year.

New Developments

Oglebay, Norton & Co., Cleveland, has opened its new Saginaw mine, St. Clairsville, Belmont County, Ohio, which it reports is the first operation in the state to use the new Joy continuous miner. The two miners now in operation are to produce 1,000 tpd and company expects to increase the equipment to build up to an output of 3,000 to 4,000 tpd. First actual shipments from the property, which is on the Wheeling & Lake Erie R. R., were made in mid-November. Total reserves of Ohio No. 8 coal are estimated at 20 million tons. The miners load into rubber-tired shuttle cars delivering to drop-bottom mine cars. The mine cars are dumped to an underground bin, from which the coal is taken to the surface by a slope belt conveyor. Driving of the 16-deg 790-ft-long slope to reach the coal 200 ft underground was accomplished last summer. M. A. Williams is general superintendent for the company and Richard Graham is superintendent of the Saginaw mine.

First production from the New Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co., near Waltonville, Ill., was expected around the end of 1949, according to reports. The operation, which has been under development for the past two years, has twin parallel slopes driven to the coal seam 800 ft underground. The modern surface plant includes seven concrete-type storage silos for raw-coal storage, each with a capacity of about 500 tons. Kenneth M. Rodenbush is mine superintendent.

The Amherst Coal Co. is planning to build an extensive river terminal on the Ohio River at Huntington, W. Va. Coal will be shipped from the company's operations in Logan County via the C. & O. The development marks the company's first major entry into river shipment.

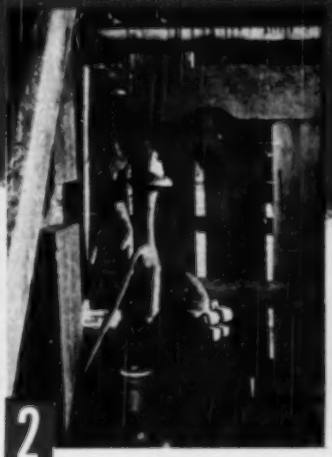
The new Buffalo Creek preparation plant of the United Electric Coal Cos., Dawson Springs, Ky., began operation Nov. 22. The 350-tpd plant, which was designed by Ned Dress, United Electric chief mechanic, will crush, wash and grade four sizes of West Kentucky No. 6 coal. It is equipped with an oil-treating system and fine sizes are dried in two centrifugal driers. Most of the plant equipment was fabricated at the mine.

The Pocahontas Fuel Co., Inc., has set Jan. 1, 1951, as the approximate date of the reopening of its Itmann mine, Mullens, W. Va., plans for which have been previously announced. Work to connect the old part of the mine with the new portal was expected to be started soon and construction of a new tipple and preparation plant is already under way, it was reported. The property, which has been closed for 21 years, has reserves of about 45 million tons of Pocahontas No. 3 coal and a production of 1,000,000 tons annually is being planned.

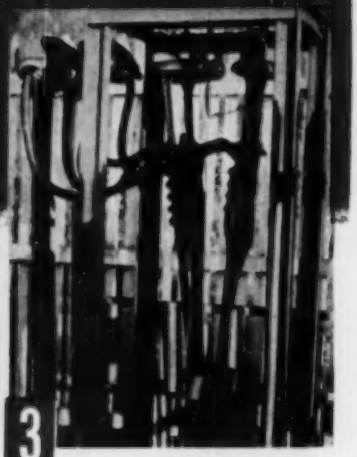
The Kaiser Steel Corp. has leased an additional 600 acres of coking-coal reserves from the Department of the Interior. The property, which is located in central Utah, reportedly brings the total of new coal deposits under the lease by the company up to 3,640 acres, for a total reserve of 36 million tons.

5 GOOD WAYS TO INSTALL SHAFT OR BOREHOLE CABLE

LIGHT-WEIGHT ALUMINUM BOREHOLE CABLE suspended by strain insulators clamped to conductors. This 5KV cable with ground wires is 3/c 350,000 CM with Hazard long-lived, high voltage Keystone oil-base insulation and an overall covering of a tough, moisture, flame, and weather-resistant Hazaprene ZBF Sheath. Borehole is 700 feet deep and carries a 2,300 volt a-c circuit to an underground rectifier station. Cable length is 1050 ft. from outside power line to underground station.

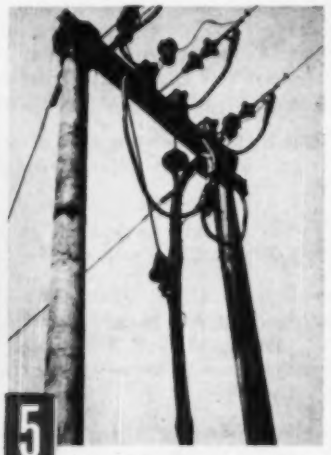


CONCENTRIC SHAFT-CABLE INSTALLATION 250-volt, d-c, 1,000,000 CM concentric cable suspended in conduit in shaft by means of I beams installed over shaft opening. Concentric conductor clamped, with copper strands bent back and refastened over clamp. Two 350,000 CM, 250-volt d-c cables also installed in shaft in conduit. These cables are supported from steel beams by strain insulators and clamps to conductors. All insulation is 600-volt Watercite with a protective sheath of Hazaprene ZBF.



4 CABLE INSTALLATION suspended from simple steel structure. Each cable is 500,000 CM, carries 550 volts d-c with two positives and two negatives. Conductors have Hazard moisture-resistant, 1000-volt, Watercite insulation. Unequalled outside protection against moisture, flame, acids and mechanical damage is provided by tough Hazaprene ZBF Sheath. Borehole is 500 feet deep with cables held by strain insulators and strain clamps on conductors.

SIX D-C FEEDER CABLES installed in a 600-foot borehole. Each cable is 250,000 CM, with 600-volt Watercite insulation and a tough Hazaprene ZBF Sheath. A strain insulator with clamp connected to the conductor supports these cables individually from simple steel structure.



4100 VOLT TRANSMISSION LINE to underground pumping stations and power-conversion stations for d-c haulage and mining equipment. Cable is a 3/c, 4/0, 5000-volt Hazard Borehole cable with long-lived Keystone oil-base insulation protected over-all by a Hazaprene ZBF Sheath. Suspension is accomplished by two strain insulators and Kellems grips.

HAZARD MINE POWER CABLES ENGINEERED FOR BOREHOLE USE GIVE YOU A DIRECT, TROUBLE-FREE, ECONOMICAL CIRCUIT TO UNDERGROUND WORKINGS

THERE are many good ways to install borehole or shaft cable, and on this page are shown some typical methods that have proved successful.

Of vital importance, of course, to any borehole or shaft installation is the design and construction of the cable used. And there is a wealth of first-hand experience in the selection of mine power cables readily available to you. Over the years, much Hazard research and engineering has been devoted to developing specialized mining cables—in cooperation with mining engineers — that simplify installation problems and costs . . . that assure long, trouble-free service.

An experienced Hazard engineer will be glad to discuss your own particular operating requirements with you. Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, N. J.

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HAZARD

THIS MAN WOULDN'T NEGLECT

A MACHINE IN HIS PLANT

...yet he hasn't had a Chest X-Ray!

He checks every piece of mechanical equipment he owns for wear, lubrication, efficiency.

Yet he fails to take the simple precaution of a Chest X-Ray to make sure he does not have tuberculosis. *Not because he's opposed to the X-Ray. Simply because he is not sufficiently informed—or just hasn't taken the time and trouble, or does not realize the seriousness of the problem.*

A Chest X-Ray is the first step toward detecting tuberculosis in its early stages. And in its early stages it can be cured with the least loss of time from work.

So, if you're the man above, that one simple reason should make you get your Chest X-Ray—*today*. But listen, see how serious this really is:

Between the ages of 15 and 34, tuberculosis leads all other diseases as a cause of death—although at no age are you safe from TB. Yet, if everyone does his part by getting a Chest X-Ray periodically, and the majority of cases thus discovered are followed up, we can eliminate TB entirely as a public health hazard!

Will you do your part today? Get a Chest X-Ray. It may mean your life!

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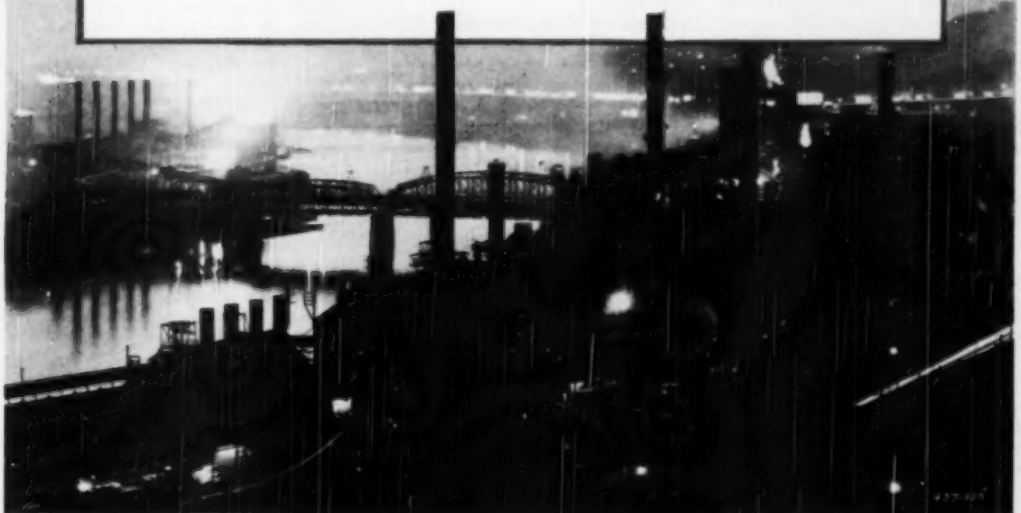
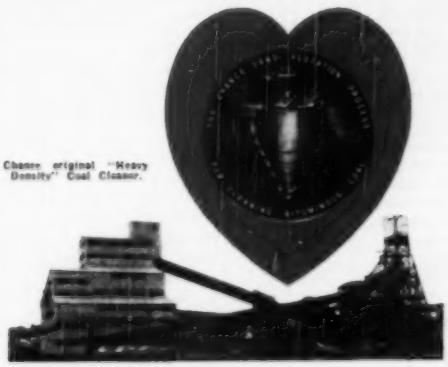
UNIFORM QUALITY OF *Chance* CLEANED COAL NOW IN GREATER DEMAND BY STEEL PRODUCERS



DOES YOUR COAL QUALIFY FOR THIS GROWING MARKET?



Chance original "Heavy Density" Coal Cleaner.

The steel industry needs more uniformly clean coal . . . coal that can be converted with minimum loss into highest quality coke. It takes a scientifically and uniformly prepared coal to provide this necessity — and producers whose plants are equipped to supply this "metallurgical coal" are reaping the benefits in premium prices.

Are your preparation methods producing coal of uniformly high chemical and physical quality to enable you to compete successfully? If you'd like help or advice call on the FAIRMONT ENGINEERS.

FAIRMONT designs and builds complete coal preparation systems . . . Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning.

Sealing of the mine of the Pacific Coal Co., Mercer, Ky., was ordered Dec. 13, by state and federal inspectors after a mine fire discovered early that day could not be gotten under control. Company officials said that the mine might be closed for three or four months and that damage might be as high as $300,000. The property employs 225 men and produces 200,000 to 300,000 tons annually. It was thought that the fire was started by sparks from a trolley.

Reopening of the former Butler colliery of the Jermyn-Green Coal Co. was expected to get under way last month, after 165 former employees voted to return to work. The property had been taken over by the Heidelberg Coal Co., as previously announced, but actual resumption of operations was delayed pending settlement of back wages due workers under the Jermyn-Green management. According to union officials, the door to negotiations for back pay was left open in the agreement miners were accepting and they would probably seek wages due through bankruptcy litigation.

The DePue Coal Co., Kings Creek, Ky., reportedly is developing three new truck mines in Martin County, near Pilgrim, Ky. The mines will have a capacity of 1,000 tpd and will ship via the N. & W.

The Kentucky Fuel Co., Hellier, Ky., has leased the Allegheny mine of the Hellier Coal & Coke Co. Tom Price is president of Kentucky Fuel and output of the mine will be handled by Tildesley Coal Co.

News Briefs

Highlighting the effects of the three-day week and mine stoppage, the Truax-Traer Coal Co. last month reported to stockholders that during the three-month period ending Oct. 31, 1949, its net profit was $4,213, as compared with $1,325,515 in the same three months of 1948. Comparative tonnages produced were 945,052 against 1,861,260, and during the 1949 quarter its Illinois and West Virginia mines worked only 20 out of the 65 days possible on a five-day week basis.

Pennsylvania has instituted an intensive study of air pollution, with the establishment of a special division of the Bureau of Industrial Hygiene to concentrate on the problem. Expected to play an important part in the work is a new mobile field laboratory being built for the state by the Mine Safety Appliances Co. and which will be completely equipped to take air samples and make on-the-spot analytical studies of questionable atmospheres.

MEETINGS

- **AIEE: winter meeting Jan. 30 - Feb. 3, Hotel Statler, New York City.**
- **Bituminous Coal Research, Inc.: annual meeting, Feb. 9, Netherland Plaza Hotel, Cincinnati, Ohio.**
- **AIME: annual meeting, Feb. 12-16, Hotel Statler, New York City.**
- **Southern Coal Producers' Association: annual meeting, Feb. 13, Washington, D. C.**
- **Stoker Manufacturers' Association: Winter Membership Conference, Feb. 16 (tentatively), La Salle Hotel, Chicago.**
- **Midwest Power Conference: 12th annual conference, sponsored by the Illinois Institute of Technology with the cooperation of 18 midwestern universities and professional societies, April 5-7, Hotel Sherman, Chicago.**
- **American Mining Congress: Coal Convention, April 24-26, Netherland Plaza Hotel, Cincinnati, Ohio.**

An "external" combustion engine that could burn coal or wood instead of gasoline is being given a life test at the Naval Engineering Experiment Station in Annapolis. Fuel is burned entirely outside the cylinder and only air is used inside. A modern adaptation of an old design, the engine reportedly starts easily, operates with no more noise than a sewing machine and can be adapted to extremely low temperatures.

The proposed 130-mi belt from East Liverpool to Lorain, Ohio, is still alive and is at present in the engineering stage, which may take two more years, H. D. Stewart, Akron, head of the sponsoring company, recently reported. The Ohio legislature last year failed to pass an act permitting the project to obtain a right-of-way by eminent domain but the proposal will be again put before the legislature.

A reduction in Pennsylvania workmen's compensation insurance rates for coal mining has been announced, effective Jan. 1, 1950. The new schedule provides an over-all rate cut for anthracite mining of about 1.5%. The rate for anthracite occupational diseases drops 18%; for bituminous mining, 11%; for bituminous occupational diseases, 13.3%; surface mining, 1.3%; culm recovery, 12.5%; and for coke burning, 22.5%.

The St. Louis-San Francisco Ry. has been authorized by the ICC to purchase 15 diesel-electric switching locomotives and 14 diesel-electric passenger locomotives at an estimated cost of $5,414,860.

Some 58 youths are enrolled in two courses in coal mining, meeting five days a week, being given at the Portage (Pa.) Joint Senior High School. Talks by coal-mining executives from the area supplement the technical instruction.

Five mobile rescue trucks were scheduled to be put into service last month by the West Virginia Department of Mines. To be stationed at strategic points throughout the state, the trucks will have facilities for making rock-dust and air analyses, in addition to first-aid and rescue equipment.

Jan. 1 was slated to see the official end of local taxes that have plagued the coal industry throughout Pennsylvania. The legislature last year gave school districts until July 1 to revoke their taxes on coal and set a deadline of Dec. 31 for third-class cities, boroughs and first-class townships. Some 181 local units, including 159 school districts, reportedly taxed the industry in one form or another.

A new booklet entitled "How to get More Heat for Less Money" has been developed by the Anthracite Institute for distribution to customers by anthracite dealers. Prepared in a handy pocket size, the booklet gives the anthracite user detailed information on care of his furnace, proper firing methods, how to correct common troubles, etc. It is available with imprints of individual dealers on the back cover.

One of the major topics of the fifth annual University of Illinois Small Homes Council short course in residential construction for builders and contractors will be basementless homes. The course, to be held at the university Jan. 25-26, will review the Council's research work in construction methods and residential planning during the past 12 months.

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 COLLIERY ENGINEER, with which MINES AND MINERALS previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., Inc., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 39 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher, John M. Carmody, Sydney A. Hale and Ivan A. Given. The editorial staff of COAL AGE presently consists of: Ivan A. Given, J. H. Edwards, William H. McNeal, W. A. Stanbury Jr. and Harold Davis.

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Indiana Preparation Society Elects Officers

R. H. SWALLOW, Ayrshire Collieries Corp., Indianapolis, Ind., was elected president of the Indiana Coal Preparation and Utilization Society at its annual meeting at the Deming Hotel, Terre Haute, Ind., Nov. 16. J. S. Bond, Enos Coal Mining Co., and Roy Ault, Shasta Coal Corp., were chosen vice presidents, and C. C. Lydick, managing director, Coal Trade Association of Indiana, was reelected secretary-treasurer. Speaker of the evening was Reed Moyer, assistant to the vice president, Central Indiana Coal Co., Indianapolis, who discussed "Coal: Fallacy and Fact" (November, 1949, *Coal Age*).

New members of the board of directors were elected as follows: R. G. Baughman, Central Indiana Coal Co.; Heber Conrad, Enoco Collieries, Inc.; Lynn Caton, Hickory Grove Coal Mining Corp.; A. F. Whitt, Pyramid Coal Corp.; Max Tuttle, Enos Coal Mining Co.; Richard Mullins, Ayrshire Collieries Corp.; and David Ingle Jr., Ingle Coal Corp.

Including S. B. Richey, Sterling-Midland Coal Co.; Hugh B. Lee Jr., Maumee Collieries Co., and Max A. Matthews, Templeton-Matthews Corp., retiring as board members and officers, the photo shows the following: front row, left to right, Messrs. Tuttle, Matthews, Swallow, Lydick and Richey; rear row, left to right, Messrs. Lee, Moyer, Ault, Bond, Conrad and Caton.

Association Activities

American Mining Congress, at its annual meeting in New York, Dec. 7, re-elected as president, Howard I. Young, president, American Zinc, Lead & Smelting Co., for his 17th year as president of the organization. Re-elected as vice presidents were Andrew Fletcher, president, St. Joseph Lead Co., and Donald A. Callahan, president, Callahan Consolidated Mines, Inc. W. J. Jenkins, president, Consolidated Coal Co. of St. Louis, was elected vice president to succeed James D. Francis, chairman of the board, Island Creek Coal Co. Julian D. Conover was re-elected secretary of the organization. Elected directors of the AMC board were: V. P. Gaffney, vice president, Cleveland Cliffs Iron Co.; W. H. Hoover, president, Anaconda Copper Mining Co.; Neil W. Rice, chairman of the board, U. S. Smelting, Refining & Mining Co.; J. T. Ryan, Jr., executive vice president, Mine Safety Appliance Co.; Morrill E. Shoup, president, Golden Cycle Corp.; L. R. Kelce, president, Sinclair Coal Co.; Mr. Young; and Raymond E. Salvati, president, Island Creek Coal Co.

Illinois Coal Operators' Association, at its 20th annual meeting in Chicago, Dec. 13, elected the following as members of the executive board: D. W. Buchanan, George B. Harrington, E. R. Keeler, T. C. Mullins, Stuyvesant Peabody Jr., R. E. Snoberger, A. H. Truax and William P. Young. C. W. Peterson was elected treasurer. Following the meeting, the executive board met and elected T. G. Gerow president of the association, Fred S. Wilkey secretary, and Thurlow G. Essington general counsel.

New River Coal Operators' Association, at its annual meeting, Dec. 6, elected officers as follows: president, J. M. McCauley, The New River Co.; vice president, L. C. Campbell, Coal Division, Eastern Gas & Fuel Associates; treasurer, P. M. Snyder; and secretary-traffic manager, Stanley C. Higgins. L. Ebersole Gaines, The New River Co., and Mr. Campbell were named directors on the board of the Southern Coal Producers' Association, and R. H. Morris and P. P. Kerr were made directors on the board of the West Virginia Coal Association.

Coal Trade Association of Indiana, at its annual meeting in Terre Haute, Nov. 18, elected as president Phil H. Templeton, secretary-treasurer, Templeton Coal Co., to succeed O. L. Scales, vice president, Enos Coal Mining Co. William M. Zeller, president, Knox Consolidated Coal Co., was elected vice president to succeed Mr. Templeton. At the annual meeting of the **Indiana Coals Corp.**, an affiliate of the associated and statistical agency of the Indiana procedures, all officers were re-elected as follows: president, Hugh B. Lee, vice president, Maumee Collieries Co.; vice president, B. E. Lundblad, vice president, Central Indiana Coal Co.; and secretary-treasurer, C. C. Lydick, managing director, Coal Trade Association of Indiana.

Southern Appalachian Coal Operators' Association, at its annual meeting Nov. 18, re-elected L. C. Gunter, president. Other officers named were S. G. Moore, first vice president; D. E. Griffith, second vice president; and C. W. Davis, secretary.

Harlan County Coal Operator's Association, at its 33rd annual meeting held in Harlan, Ky., Nov. 16, elected as president, R. C. Scott, general manager, Cornett-Lewis Coal Co. M. M. Ellison, general manager, Southern Harlan Coal Co., was elected vice president, and George S. Ward was re-elected secretary. Members of the executive board are: Pearl Bassham, president, Harlan-Wallins Coal Corp.; C. V. Bennett, president, V. & C. Coal Co.; Kenes Bowling, president, Bardo Coal Mining Co.; R. W. Creech, Jr., manager, Creech Coal Co.; C. S. Guthrie, manager, Harlan Fuel Co.; S. J. Dickenson, secretary-treasurer, Mary Helen Coal Corp.; F. L. Dupree, president, Clover Darby Coal Co.; J. S. Greene, president, Garmeada Coal Co.; Elmer D. Hall, president, Three Point Coal Co.; L. P. Johnson, manager, Crummies Creek Coal Co.; and J. E. Taylor, manager, High Splint Coal Co.

Hazard Coal Operators' Association, at its annual meeting in Lexington, Ky., Nov. 17, re-elected as president, George P. Fitz, president and general manager, Ajax Coal Co., who has headed the organization for a number of years. L. A. Hopper was re-elected executive secretary and treasurer and members of the board were re-elected.

Fuels Research Council, Inc., has reported new officers elected by the board of directors, Nov. 23 as follows: president, F. A. Fontyn, president, Ebensburg Coal Co.; vice president, C. A. Owen, president, Imperial Coal Corp.; treasurer, M. R. Glover; general counsel, Tom J. McGrath; and secretary, James W. Haley. At a

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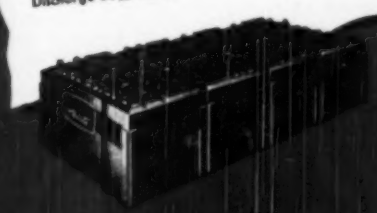

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meeting of stockholders earlier in the month, the following directors were elected: Mr. Owen; D. L. Mackie, general counsel, D., L. & W. R.R. Co.; J. H. Nuelle, president, D. & H. R.R.; Frank W. Earnest Jr., president, Anthracite Institute; and E. J. Kerr, manager of technical services, B. & O. R.R. Co.

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Howard Appointed to Munitions Defense Post

Hubert E. Howard, chairman of the board, Binkley Coal Co., and affiliated companies, Chicago, was named Nov. 25 by Pres. Truman to the post of chairman of the Munitions Board of the Department of Defense. Under the amended National Security Act, the board has broad authority in the planning of industrial mobilization for defense.

Mr. Howard had served as chairman of the Personnel Policy Board of the Department of Defense since last Sept. 1, in which position he was responsible for establishing all personnel policies for civilian and military personnel in the department. The appointment to his new post is a recess appointment, subject to confirmation by the Senate at the session opening this month.

In accepting the appointment, it was necessary for Mr. Howard to sever his connection with the several coal companies with which he has been associated for more than 20 years. The prior nomination of Carl A. Ilgenfritz, vice president of the U. S. Steel Corp., was rejected by the Senate last fall because Mr. Ilgenfritz would not renounce his $70,000 annual salary from the steel corporation to accept the $16,000-a-year government position.

•

W. Va. Official Rules On Fireboss Inspection

West Virginia mines should be inspected by firebosses when only maintenance men are in the mine the same as on regular working days, the state attorney general's office ruled Nov. 23.

The opinion, which was prepared by William H. Ansel, assistant attorney general, was issued as a result of a request last October. 14 by Arch J. Alexander, chief of the Department of Mines (*Coal Age*, November, 1948, p. 140). Mr. Ansel stated that he could draw no distinction, as far as the state code was concerned, between the safety procedure required for 10 maintenance men and for 100 miners. The opinion reportedly maintained that the abandoned parts of a mine should likewise be firebossed on idle days.

Mr. Alexander's request for the legal opinion followed an inquiry by C. E. Jones, safety director, District 29, UMWA, who maintained that the entire mine should be firebossed if men were working anywhere in it. The practice in the state had been to inspect only those parts where men were working on idle days.

Earlier, both Gov. Patterson and Attorney General Ira J. Partlow denied Nov. 17 that Mr. Partlow had resigned to become McDowell County circuit judge under pressure. Mr. Jones had charged the previous day that his resignation and replacement by William C. Marland, a son of a mine superintendent, looked as if coal "operators can't get their way one way, they will try another method."

EQUIPMENT APPROVALS

Eight approvals of permissible equipment were issued by the U. S. Bureau of Mines in November, as follows:

Goodman Mfg. Co.—Type G-15 or GS-15 shaker conveyor; one motor, 15-hp, 500 v, ac; Approval 2-698A; Nov. 3.

Goodman Mfg. Co.—Type 97-C-30 belt conveyor; one motor, 20 hp, 550 v, ac; Approval 2-699A; Nov. 8.

Joy Mfg. Co.—Type WL-808 air compressor; one motor, 75 hp, 500 v, dc; Approval 2-700A; Nov. 15.

Jeffrey Mfg. Co.—Type 70-U universal cutting machine; two motors, one 25 hp and one 50 hp, 250 v, dc; Approval 2-701; Nov. 17.

Ensign Electric & Mfg. Co.—Distribution box; 220 and 440 v, ac; Approvals 2-702 and 2-702A; Nov. 18.

Joy Mfg. Co.—Type U-166-44E conveyor; one motor, 40 hp, 250 v, dc; Approval 2-703; Nov. 18.

Brown-Fayro Co.—Type HKD hoist; one motor, 10 hp, 250 v, dc; Approval 2-704; Nov. 21.

Goodman Mfg. Co.—Type G-20 or GS-20 shaker conveyor; one motor, 20 hp, 500 v, ac; Approval 2-705A; Nov. 22.

W. Va. Bureau Requires Roof-Bolting Permits

West Virginia mines wishing to employ or conduct experiments in roof-bolting must first obtain a permit from the W. Va. Department of Mines.

In explaining the reasons for the ruling, effective Dec. 1, the department, in its semi-annual report, stated that there were more than 50 experiments now in progress in the state, some started more than a year ago. "While there have been no serious accidents and some of the trials are reported to be meeting with quite a measure of success," the publication states, "they present a new and very serious problem to the Department of Mines.

"The policy of the Department of Mines must be directed to encourage progress," the report continued. "It shall not be directed to discourage orderly experiments that may develop the means of saving lives of a countless number of coal miners. However, the inspector must see that the trials are carried out in a systematic manner, employing every precaution against failures and accidents.

"It is necessary that the department acquire certain information necessary to the exercise of a measure of control over these experiments in order to avoid failures, to prevent installations considered dangerous and to provide records upon which to base future recommendations and advice. . . ."

In Pennsylvania earlier last fall, development work on the new P. & R Porter Tunnel mine was temporarily halted by state mine inspectors until some 500 ft. of roof-bolt suspension could be replaced with conventional timbering. Roof-bolting of approximately half of the tunnel driven to date had been carried out in conjunction with officials of the federal mine bureau, who approved the work, but state inspectors reportedly maintained that it was unsafe and contrary to mine regulations.

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New Members Named to Bituminous Coal Council

Secretary of the Interior Chapman Dec. 14 appointed three new members of the National Bituminous Coal Advisory Council, an organization set up to advise the Interior Department on coal-industry problems.

The new appointees are: Milton H. Fies, manager of coal operations, Alabama Power Co.; Laurence E. Tierney Jr., president, Eastern Coal Corp.; and R. M. Davis, president, Davis-Wilson Coal Co.

•

Hillman Coal Officials Complete Safety Course

The Hillman Coal & Coke Co. recently played host at dinner to 154 officials and guests to mark completion of a safety course given for company officials by the U. S. Bureau of Mines. Of the 142 men starting the course, 138 completed.

Speakers at the dinner, in addition to top company officials, included Garfield Thomas, deputy secretary, Pennsylvania Department of Mines; J. J. Forbes, U. S. Bureau of Mines; and M. D. Cooper, director, NCA mining engineering education. The talks were followed by a showing of a Joy Mfg. Co. film on the use of mining machinery. The program also included a professional football game.

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PARTICIPATING in the joint meeting of the West Virginia Coal Mining Institute and Central Appalachian Section, AIME, were: J. V. Sullivan (standing, left), W. Va. Coal Association; and D. L. McElroy, Pittsburgh Consolidation Coal Co.; Charles W. Conner (seated, left), Armco Steel Corp.; and C. R. Bourland, New River Co.; Edward Thomas (right photo), U. S. Bureau of Mines; George W. McCan, Consolidation Coal Co. (W. Va.); and J. A. Hagy, Jewell Ridge Coal Corp.

W.Va.—AIME Groups in Joint Meet

Belt Track Haulage, AC Power Underground, Mercury-Arc Rectifiers, Roof Bolting, Refuse Disposal and Coal Markets Feature Joint Meeting of West Virginia Coal Mining Institute and Central Appalachian Section, AIME

THE DANGERS inherent in dry drilling for roof bolting were among the varied topics covered at the Uniontown, Pa., joint meeting of the West Virginia Coal Mining Institute and the Central Appalachian Section, AIME; held at the Summit Hotel, Nov. 11-12. Savings with belt haulage, advantages of ac power underground, some disadvantages in the use of mercury-arc rectifiers, the market outlook for coal, West Virginia's unwarranted compensation-fund surplus and the unsolved problems of preventive firing in refuse disposal were other highlights of papers presented at the three technical sessions. George R. Higinbotham, vice president—operations, Consolidation Coal Co. (W. Va.), was elected president of the West Virginia institute. Election by letter ballot of W. A. Staab, mining engineer, Calcium Chloride Association, as chairman of the Central Appalachian Section, AIME, was announced.

OTHERS ACTIVE on the program of the joint meeting included: John L. Patty (left), W. Va. Department of Mines; C. W. Thompson, Weirton Coal Co.; R. M. Hunter, Rochester & Pittsburgh Coal Co.; George C. Barnes Jr., Virginia Polytechnic Institute; and Jesse Redyard, Redyard Coal Co., retiring president of the West Virginia Institute.

Jesse Redyard, Redyard Coal Co., Pineville, W. Va., retiring institute president, and R. H. Allen, Well Service Co., Inc., Charleston, retiring chairman of the Appalachian section, shared the responsibilities of opening the sessions and presiding. "Federal Legislation Affecting the Coal Industry" was the subject of John D. Battle, executive vice president, National Coal Association, at a luncheon, and "The Fallacy of the Free Lunch or Government in Business" the theme of Rush D. Holt, speaker at the dinner. Session chairmen and co-chairmen were: R. M. Hunter, electrical engineer, Rochester & Pittsburgh Coal Co.; Charles W. Connor, consultant, Armco Steel Corp.; C. R. Bourland, assistant vice president, New River Co.; George W. McCan, general superintendent, Consolidation Coal Co. (W. Va.); and James A. Hagy, general superintendent, Jewell Ridge Coal Corp.

The conclusion that ac power underground is preferable to dc, especially when belt haulage is used, was

When This Mine Mechanized they ran into difficulties

This particular mine in West Virginia found that mechanized full seam mining reduced operating costs and speeded up production, but mechanical mining also gave them some problems in the form of oversize and refuse that passed through the crusher. This oversize and refuse blocked washer refuse gates, causing frequent plant stoppages. The owners called in Pennsylvania engineers, and after a complete analysis of the problem a 10½' x 17' Open Feed End Pennsylvania Roller Mounted Bradford Breaker was erected in parallel with the existing primary shaking screens, picking table and lump crushing equipment (which can be used if necessary as an alternate flow).

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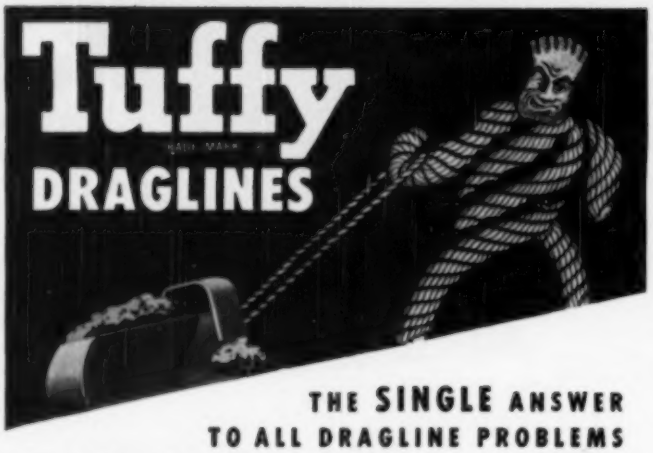

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reached by John L. Petty, electrical inspector-at-large, West Virginia Department of Mines. His paper, "New Developments and Trends in the Application of AC Power for Coal-Mine Purposes," described three specific installations. In the first, a belt-haulage mine, the substituton of dry-type transformers for the liquid type resulted in a 40 to 50% time saving in moving transformer substations. At a second mine, converted from hand-loading and dc to mechanical operation with ac but maintaining dc track haulage, the additional power for face operations ac was supplied to all sections at 50 to 60% of the cost of one rectifier.

At a third new mine in 40-in coal utilizing mechanical loading onto chain conveyors and belt transportation to the surface, power is taken in at 4,160 v by a cable with built-in ground conductors suspended from the roof of an intake airway. At a portable central substation, the voltage is reduced to 480 and then transmitted by No. 4/0 three-conductor portable cables to section stations which, by star-connected secondary transformers, reduce it to 240 v with but 139 v to ground. Trip relays provide ground protection. Assuming that but one portable rectifier would have been used for dc power at this mine, the cost of the ac installation was approximately 60%.

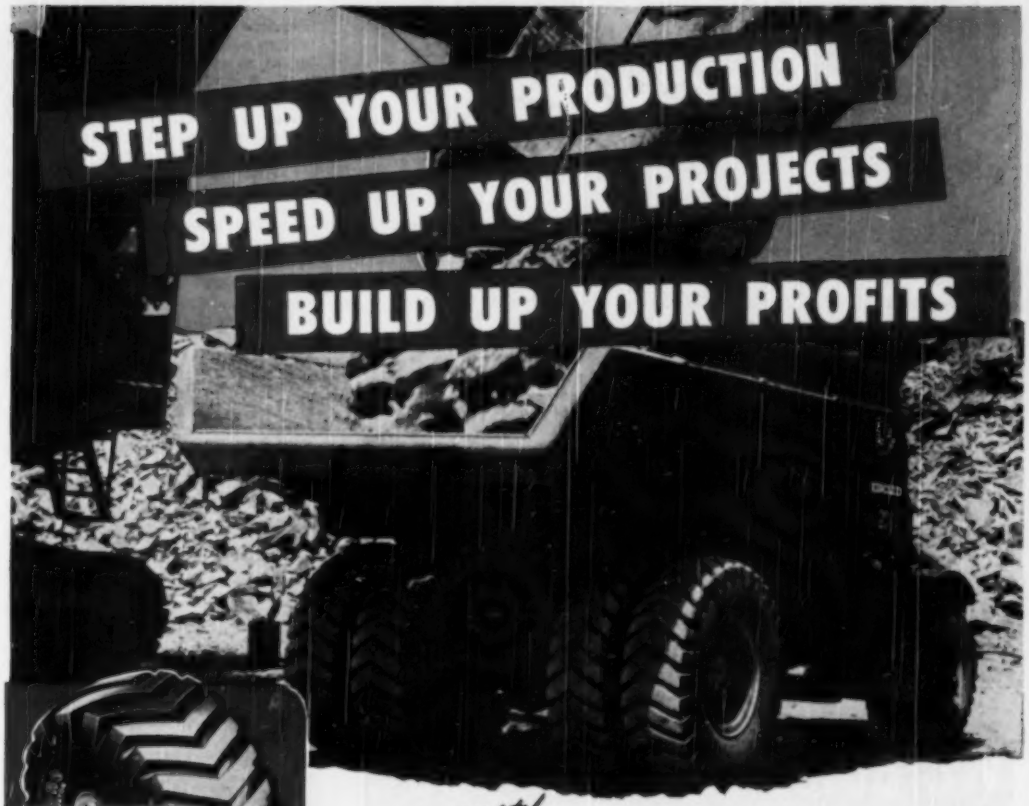
Mr. Petty summed up the advantages of ac as follows: higher conversion efficiency; lower substation first costs; 30% fewer maintenance men required in an ac mine; a much lower substation installation cost in thin coal seams; greater flexibility in distribution; lower power consumption per ton of coal; and more tons produced per man-day—6.45 against 5.08, according to a study of five ac and five dc mines of comparative characteristics.

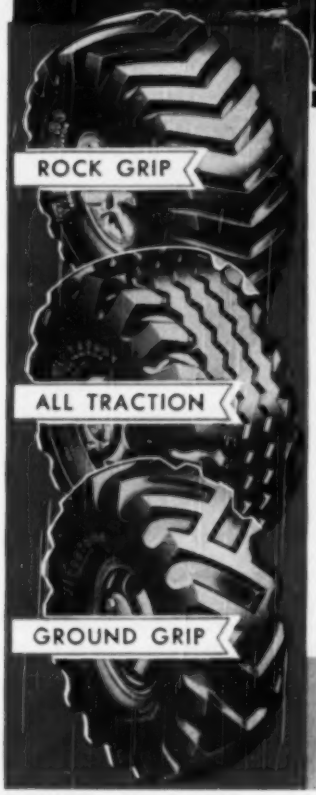
The disadvantages of ac are: less ability of equipment to stand surge-power abuses; not suitable for locomotives; a possibly higher cost for cables; and more expensive equipment.

In answering questions, Mr. Petty said that the West Virginia department has approved the use of dry-type transformers on intake air but is still studying the toxic effects of non-inflammable liquid transformers. Also, he reported that in West Virginia high-voltage cables need not be buried unless installed on the haulageway.

"Power-Conversion Equipments for Coal Mining" were discussed by Geo. C. Barnes, Jr., professor of electrical engineering, Virginia Polytechnic Institute. The paper compared first cost, applicability cost, cost of operation, maintenance costs and power factors on the basis of test work on specific equipments at V.P.I.

In discussing the paper, Mr. Hunter said that his company, which started using rectifiers in 1944 in parallel with motor-generators, found





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Firestone tires are precisely engineered, both in body construction and in tread pattern, for your job. The cut-resistant treads are extra thick and extra tough. The bodies, armored by four "punch-protector" plies and double-thick sidewalls, are made of heavy, high-tensile, low-stretch, Gum-Dipped cords.

Your Firestone representative will recommend the right tires for your job, and will follow through and see that you get every dime's worth of built-in extra value. Let him prove it.

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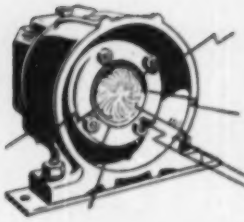

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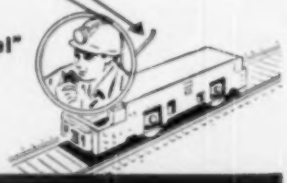
- Assures safety
- for greater profits



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4" Type SW-OB, frame 143M wet pit pump with motor.

Nagle Pumps

INDUSTRIAL PUMPS FOR ABUSIVE APPLICATION

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that telephone interference from rectifiers was eliminated by clearing the telephone line of grounds. Experience to date points to use of rectifiers for future substations on the company. C. R. Huffman, Monongahela Power Co., said he is sold on rectifiers, one reason being immediate pick-up of the load after an interruption.

Per-ton-mile haulage costs of 2.8c for complete belt mines and 20c for track-haulage mines were shown in a "Conveyor Haulage Vs Track Haulage" chart presented by C. W. Thompson, Weirton Coal Co. The study was based on data from 10 belt and 10 track-haulage mines. In the belt mines the average haulage labor cost is 5 mills, while in the track mines it is 8c. J. B. Haskell, West Virginia Steel & Mfg. Co., pointed out that apparently the haulage costs did not take into account rubber-tired equipment for handling supplies and men in the belt mines.

A shrinkage of coal production, which may be brought about by continued and unwarranted burning of residual oil and gas, cannot be restored quickly when the need comes, it was emphasized in a paper on "Coal and the Energy Structure," by Geo. A. Lamb, Pittsburgh Consolidation Coal Co., read by Mr. McElroy of that company. Mr. Lamb maintained that at least 100,000,000 bbl of oil burned should be replaced by coal. Oil is a much better starter for making gasoline than coal. It is wrong for coal to be the variable substitute in the energy structure. In 1948, the excesses of oil and gas were equivalent to only 15,000,000 tons of coal, which is a small amount on which to depend, he pointed out.

Discussion made the point that coal operators must not sit back with the idea that their troubles will be over in "12 to 15 years" when the proved gas and oil reserves are used up. Instead, they should get busy and do everything possible now to preserve the coal industry's position. That "12 to 15 years" has been heard since the early 20's. Perhaps oil and gas producers do not want to prove reserves too far in advance and pay additional taxes thereon, it was suggested.

Compensation costs in West Virginia are far too high because administration of the compensation law is fast becoming a political football, the compensation office is the champion liberalizer and the reserve fund is much greater than necessary, said J. V. Sullivan, secretary, West Virginia Coal Association, in a paper that included data on decrease of accidents, increased compensation expense and liberalized awards. In West Virginia, the coal industry contributes 70% of the annual premium. Unless a halt is called on burdening coal, operators perhaps will have to look to other means of protecting their men.

Silicosis dangers in dry drilling for roof bolting were emphasized by Edward Thomas, U. S. Bureau of Mines, in a talk on roof bolting accompanied

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—and see what a truly complete piping materials service can do for you. Just remember: **if it's piping equipment for mines, most likely it's in the broad Crane line.** One order covers everything for the job. No one can give you better service than Crane, through a network of well-stocked cooperating Branches and Wholesalers backed by large factory stocks.

Standardizing on Crane as a **Single Source of Supply** simplifies every piping procedure, from the design to erection and maintenance of systems. **One Responsibility** for valves, fittings, pipe and accessories makes for better installations, avoids needless delays. And for **Highest Quality** in every item, Crane Quality stands unsurpassed for more than 90 years.

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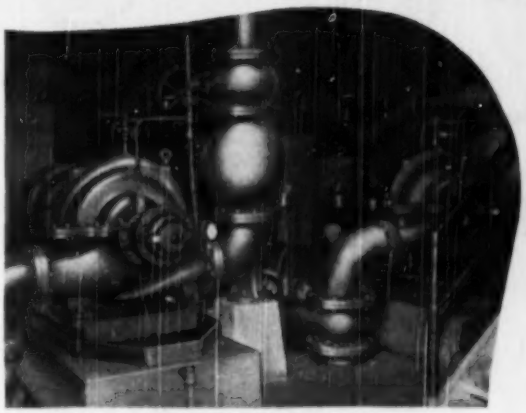

PRIMARY SPRAY PUMPS *in a large breaker plant, featuring Crane Standard Iron Body Wedge Gate and Check Valves.*

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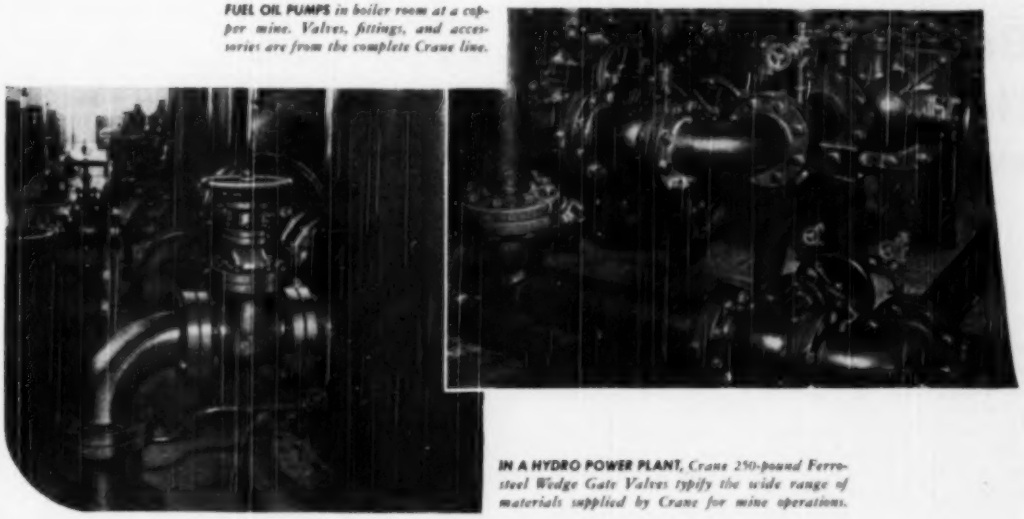

IN A HYDRO POWER PLANT, *Crane 250-pound Ferrosteel Wedge Gate Valves typify the wide range of materials supplied by Crane for mine operations.*

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Hendrick Ball Frames give troughs substantial support whatever the floor conditions. Write for full information.

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by a sound strip of roof-bolting photographs. The Bureau recommends wet drilling but is preparing to test at least two types of dust collectors. Edwin H. Johnson, Kennametal, Inc., suggested use of the rubber vacuum-cup arrangement installed on plug and feather drills used to split granite. Mr. McCaa said his company has drilled about 2,000 roof-bolt holes with Jeffrey and Chicago-Pneumatic electric coal drills supported on rubber-tired racks that include a crank and winch for feeding the drill (COAL AGE, September, 1948, p. 94).

An experiment with hickory pins 2 in in diameter as temporary roof bolts was reported by Edward H. Greenwald, assistant manager, Boone County Coal Corp., Sharples, W. Va. Recent experiments made by his company indicate that wooden pins may possibly serve for temporary work, such as in rooms which are worked out in three to four weeks with conveyor mining.

"Problems of Mine Refuse Disposal Fires," a paper prepared by Henry F. Hebley, director of research, Pittsburgh Consolidation Coal Co., and read by J. M. MacLachlan, combustion engineer, concluded that "there is no known solution, although research is actively being carried on to find one." The paper discussed the County of Allegheny (including Pittsburgh) ordinance, the gob-fire situation in England and the various methods of attempting to prevent and extinguish fires.

Prevention of segregation is recognized as the most important factor in preventing firing. "It would appear that the best practice to date for laying down the material to prevent its firing is the adoption of level layers of crushed refuse, thoroughly compacting them and covering each layer with a thickness of inert material." Sand and pulverized slag have been tried but are too porous. Clay will seal but may dry, crack and permit circulation of air. Mr. McCaa said that using 12 to 18 in of clay is an economical method that can entirely eliminate smoke and in some instances has put out fires.

•

Foreign Developments

FRANCE—French coal production, which has increased as a result of Marshall Plan aid, was expected to reach 54 million metric tons by the

Roughneck in Rock

BAKER Bulldozer and AC HD-19

Have you noticed how often Baker Bulldozers on big A-C HD-19 tractors are found in the key spots where the going is rough and tough and big yardages must be moved fast at lowest cost?

It's a fact and not mere chance! For it didn't take long for bulldozer users to find out that this big Baker — A-C combination with hydraulic torque converter drive had what it takes to outdoze anything in the field . . . for more yardage per pass . . . for easier operation . . . for rugged reliability.

These are facts that can also be proved in the field on your job. If you are still using your regular bulldozers, it will pay you to investigate this great new Baker.

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KERSEY MINE TRACTOR MODEL 444

This battery powered mine tractor has 4-wheel drive — 4-wheel steering — 2-wheel mechanical brakes. It is an ideal tractor unit for pulling trailers for hauling coal, supplies and personnel . . . The four-wheel drive provides maximum drawbar pull under all conditions . . . Two driving motors are used, each powers one axle by roller chain and full differential action is provided . . . Machine is only 24 inches high with ample deck space to operate safety in seams as low as 28 inches. Sturdy—powerful—it will be equipped with batteries to meet your operating conditions.

Full descriptive bulletin containing specifications and other operating data is available. Write for your copy today.

KERSEY MANUFACTURING COMPANY
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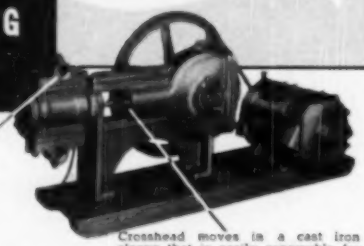
BLUEFIELD, VIRGINIA

Our *New* PORTABLE GATHERING PUMP

WITH EXTRA FEATURES



Suction and discharge chambers can be turned to meet existing pipe connections.

Crosshead moves in a cast iron sleeve that is easily renewable for economic maintenance.

Flood City Portable Gathering Pump

SPECIFICATIONS: Thoroughly guarded V belt drive. Total weight with 1 H.P. motor: 375 #; Length, 42"; Height, 23"; Width, 17" over motor. Dimensions can be adjusted to meet individual conditions.

A sturdy, compact, plunger type pump that is light enough to be moved about the mine. OTHER OUTSTANDING FEATURES: All moving parts are self-oiling and sealed against leakage and dirt . . . Double-acting, reversible water end is furnished in acid-resisting bronze or chrome steel . . . Easily replaced valve seat plate, reversible for double life . . . Leather cup-type piston gives long life and high efficiency as well as low replacement cost.

Write for more information about this Portable Gathering Pump and other FLOOD CITY mine equipment.

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end of 1949, a million tons short of the record attained in 1929 and 1930 according to the ECA. The ECA announcement attributed to "remarkable comebacks" of the French coal industry to the release of some $247,000,000 in counterpart francs for reconstruction and development of coal mines, dollar grants for American equipment and the increased output per man-shift As of September, 1949, output per pit miner per shift reached 1,110 kilos, an increase of 124 kilos over 1929 but still below the 1938 figure 1,229 kilos. The total number of pit workers decreased from 195,750 at the beginning of 1949 to 190,516 in October. This is below the 1929 total of 206,200 and also below the total employed in 1946, 1947 and 1948.

AMSTERDAM—Holland is reportedly planning to develop a new coal field at Vlodrop, near Roermond in the center of the province of Limburg. Output of about a million tons a year is expected.

POLAND—Polish coal miners were told by Pres. Bierut Dec. 4 that they must increase their extraction rate by 36% and efficiency by 35% within the next six years. A previous announcement stated that November plans had been exceeded by 4.6% but no tonnage figures were given. The goal for 1949 was 74,000,000 tons, but coal mining was reported to be the only important industry that had not completed its three-year plan quota. New plans just announced call for wide-scale mechanization, with 66% of the difficult underground work mechanized by 1955, production of mining machinery increased 350% and improvement of ventilation. Among the special privileges to be given miners are quarterly cash bonuses for perfect attendance and special badges and uniforms for the different classes of workers.

CANADA—A government bill to authorize loans to Maritime coal operators up to a total of $10,000,000 had its first reading in the Canadian House of Commons Nov. 30. Under the bill, loans will be made for 15-year periods to permit mechanizing of coal properties and increasing output. The maximum that can be loaned to any one company would be $7,500,000. Any project financed by the government must be in the "public interest and completely and efficiently planned in its economic, engineering and operating aspects," the bill stated.

GERMANY — The International Ruhr Authority has made its initial allocation of German coal for export, earmarking 4,900,000 tons of hard coal and coke and 400,000 tons of lignite briquets for shipment in the first quarter of 1950. Allocations are based on estimated daily production of 355,000 tons of hard coal in January, 357,000 in February and 360,000 in March in the Ruhr, Aachen and lower Saxony districts.

Of the total allocation 4,110,000

tons of hard coal and coke and 240,000 tons of lignite briquets will be disposed of by the Economic Commission for Europe. Austria is due to receive 720,000 tons of hard coal and coke and 160,000 tons of briquets. Some 65,000 tons of hard coal will be allocated as bunker coal for ocean-going vessels.

TOKYO—Gross overestimations of Japan's coal needs have finally been discovered, and are reflected in the recent rescinding of the 42-million-ton goal established for fiscal year 1949, ending Mar. 31, 1950. Probable production for the year will be about 38 million metric tons. Fiscal 1948 coal output was 34,768,000 tons.

Until June, coal was tightly controlled both in distribution and price and large subsidies were being paid producers. About that time realization of the actual and potential supply and demand situation became apparent. Stocks, which were only 1,277,000 tons, or less than half a month's supply, in December, 1948, reached 2.5 million tons in June and are now about 5 million tons.

All controls are now off and distribution is through private channels for all types of coal. The Coal Kodan, or government coal distribution company, was abolished in August and is liquidating its stocks. It will supply government agencies through Mar. 31, and prior to that time will auction off an additional 2 million tons to wholesalers.

In place of the Kodan, 30 wholesalers owned by the coal-mining companies are distributing coal. The wholesalers go through the motion of purchasing coal from the mines that own them, but the prices are established by the Coal Association in contravention of the fair trade practice laws and trade association laws now on the books.

Japan's Ministry of Finance has approved a 146.4 million yen budget expenditure for coal research and and mineral exploration during the fiscal year, April 1, 1950, through Mar. 31, 1951. An additional 66 million yen has been approved by the Ministry for the Mine Safety Bureau.

The first sum is split up with allotments of 400,000 yen for the Coal Exploration Advisory Committee; 11 million yen for the Coal Reserves Survey; 100 million yen for the Geological Survey (including oil and minerals as well as coal); and 35 million yen for coal-development projects.

•

Preparation Facilities

Mary Gail Coal Co., Manchester, Ky.—Contract closed with Roberts & Schaefer Co. for R&S Hydrotator-process assembly unit for cleaning 1x¼-in stoker coal at a rate of 100 tph; and R&S Super-Airflow coal-cleaner process unit with auxiliary

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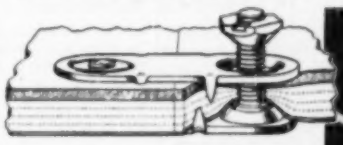

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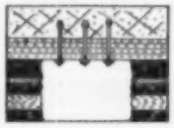

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After two years of field tests, involving 25,000 pieces of Intraset steel, the life expectancy of Intraset has shown an increase of 100 to 1, in comparison with a steel bit, and in some operations 200 to 1. One piece construction—no threads.

Put our broad experience with suspension roof supports to work in cutting your costs—boosting your output. Write us today! Rock Bit Sales & Service Co., 2514 East Cumberland St., Phila. 25, Pa. *Branch:* Asheville, N. C. *A complete Line of Pneumatic Tool Accessories.*

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DRILL STEEL
TUNGSTEN CARBIDE TIPPED

equipment for treating ¼x0 at 50 tph.

Chicago, Wilmington & Franklin Coal Co., Waltonville, Ill.—Contract closed with Roberts & Schaefer Co. for separate R&S Super-Airflow pneumatic coal-cleaning units for treating 7/16-inx10-mesh coal, capacity 150 tph, and for treating 10x48-mesh coal, capacity, 42 tph.

Peabody Coal Co., Mine No. 17, Pana, Ill.—Contract closed with Roberts & Schaefer Co. for complete preparation plant, r-o-m capacity, 600 tph; wet-cleaning portion to clean 360 tph of 6x1½-in coal, with the 1½x0 being by-passed at the present time.

Stonega Coke & Coal Co., Glenbrook, Ky.—Contract closed with Roberts & Schaefer Co. for R&S Super-Airflow and auxiliary equipment, including structures, to clean 80 tph of 1¼x0-in coal.

Bakerstown Collieries, Inc., Marion Station, Preston County, W. Va.—Shipment by Iowa Mfg. Co. of one No. 706 portable coal tipple.

Twin Seam Mining Co., Tuscaloosa, Ala.—Shipment by the Deister Concentrator Co. of two SuperDuty No. 7 coal-washing tables, to handle ¼x0.

Francis F. Steffen, Beach Haven, Pa.—Shipment by Deister Concentrator Co. of one SuperDuty No. 7 coal-washing table for cleaning No. 2 anthracite buck.

Tennessee Coal, Iron & R.R. Co., Concord No. 1 mine, Ensley, Ala.—Shipment by the Deister Concentrator Co. of eight SuperDuty No. 7 coal-washing tables to clean ¼x0-in coal (completion of contract calling for shipment of 64 of these units); and one Concenco Model 108-B revolving feed distributor.

Atlas Coal Co., Atlas, Pa.—Contract closed with Wilmot Engineering Co. for one Type A jig to prepare nut coal; feed capacity, 15 tph.

Colitz Coal Co., Pottsville, Pa.—Contract closed with Wilmot Engineering Co. for one 9-ft-diameter Hydrotator classifier oil-flotation unit to prepare silt from minus 3/64-mesh to 100-mesh; feed capacity, 30 tph.

Coal-Burning Gas Turbine In Locomotive-Size Test

The presidents of nine leading coal-carrying railroads and five major coal-producing companies Dec. 7 saw a locomotive-size gas turbine operating with pulverized coal as its fuel, at the Dunkirk, N. Y., plant of the American Locomotive Co.

According to R. B. White, chairman of the BCR Locomotive Development Committee, the tests have shown that pulverized coal can be fed continuously to a combustion chamber and

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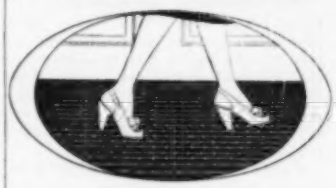
OPEN STEEL FLOORING
IS TRI-LOK



No object over ½ square inch can pass through super-safe U-Type Tri-Lok Flooring. Fabricated without bolts, rivets or welds, it is unsurpassed for plant installation, walkways, loading platforms. Efficient distribution of concentrated loads . . . maximum free opening for light and air. Write for Bulletin JW1140.

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28 to 60 tons per hour capacity	190.00
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LOGAN W. VA.

burned efficiently under a pressure of 60 psi.

"While it would be premature to assume that all of the technical problems are solved," Mr. White said, "the tests today have shown that bituminous coal can operate a gas turbine. We are particularly pleased with the combustion efficiency, in excess of 90%, and also with the performance of the ash-removal equipment. Inspection of the experimental turbine following a 38-hr run—equivalent to a round-trip by rail between New York and Chicago—showed that all components of the coal-burning gas-turbine power plant were in excellent condition."

Laboratory work leading up to the tests has been carried on under the supervision of J. I. Yellott, director of research for the Locomotive Development Committee, by a number of organizations including Battelle Memorial Institute, Johns Hopkins University, the Institute of Gas Technology and the Turbodyne Corp.

The turbine under test at Dunkirk was made available to the Committee by the U. S. Bureau of Mines. The Allis-Chalmers Mfg. Co., builders of the experimental turbine now in use at Dunkirk, has just completed the gas turbine which is destined to power the first coal-burning gas-turbine locomotive. A second power unit, on order with the Elliott Co., Jeanette, Pa., is expected to be completed this spring.

Railroad sponsors of the Locomotive Development Committee are the B. & O.; C. & O.; Illinois Central; L. & N.; N. Y. Central; N. & W.; Pennsylvania; Virginian; and the Wheeling & Lake Erie. The coal supporters are the Island Creek Coal Co., M. A. Hanna Co., Pittsburgh Consolidation Coal Co., Pocahontas Fuel Co., and the Sinclair Coal Co.

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Smoke Abatement Group Reports Progress Made

"The demand for the solution of the air pollution problem which confronts most of our larger cities has now happily passed the stage of wishful thinking," H. B. Lammers, chairman, Coal Producers' Committee for Smoke Abatement, told the annual meeting of that organization in Cincinnait recently.

"When the Coal Producers' Committee for Smoke Abatement was organized nine years ago nearly everyone assumed that all pollution in the cities came from products of combustion and especially from the combustion of coal," Mr. Lammers recalled. "This assumption has been disproved so many times that now no one conversant with the problem places any credence in it whatever.

"As a matter of fact, the really tough part of air pollution work comes after most of the smoke has been eliminated. Industrial fumes and

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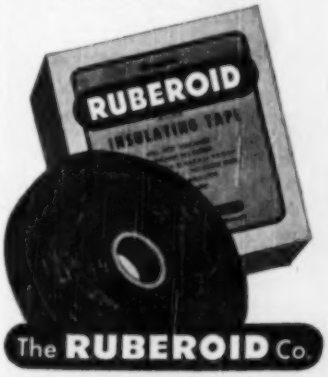

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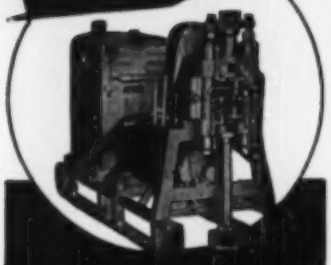

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processes add considerably more to the smogs and air pollution over our cities than does the burning of coal. The idea that the domestic consumer is the major contributor also has been largely dissipated," Mr. Lammers reported.

"The Model City program in Columbus, Ohio, has now progressed to a point," Mr. Lammers said, "where the city fathers recently issued a pamphlet on municipal activities and labeled it 'Columbus—Ohio's Model City.'" The pamphlet gives much credit to the Coal Producers' Committee for Smoke Abatement for the results achieved thus far.

Henry F. Hebley, director of research, Pittsburgh Consolidation Coal Co., reviewed the report on the Donora, Pa., smog incident in 1948, prepared by the U. S. Public Health Survey. "Despite a year's research by many scientists, the survey was unable to find conclusive evidence as to what air pollutants were responsible," Mr. Hebley reported.

Ezra Van Horn, chairman of the organization's executive committee, reported on the activities for 1949 and recommended that the work of the Committee be continued unabated to take care of the many requests for assistance. His report was adopted unanimously by the membership of the organization.

Among those attending the meeting were representatives from the B. & O. R.R.; Big Sandy-Elkhorn Coal Operators' Association; Black Mountain Corp., Inc.; Black Star Coal Corp.; C. & O. Ry.; Harlan County Coal Operators' Association; Hazard Coal Operators' Association; Kanawha Coal Operators' Association; Kentucky Coal Agency, Inc.; Logan Coal Operators' Association; L. & N. R.R.; N. Y. Central System; Nickel Plate Road; N. & W. Ry.; Northern West Virginia Coal Association; Ohio Coal Association; Pennsylvania R.R.; Southern Appalachian Coal Operators' Association; Virginia Coal Operators' Association; Western Pennsylvania Coal Operators' Association; and Operators' Association of Williamson Field.

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International Conference On Coal Preparation

An International Conference on Coal Preparation is scheduled to meet in Paris, June 26 to July 1, 1950. Sponsored by the French Government, the conference is being organized by the "Charbonnages de France," which operates all coal mines in metropolitan France.

The bureaus of mines in participating countries are being invited to be represented in a committee that is to be headed by Etienne Audibert, chairman of the board of directors, Charbonnages de France. The program, which will include discussion of all types of coal preparation, will be mailed upon request to the Secretary, Coal Preparation Conference, 35 rue

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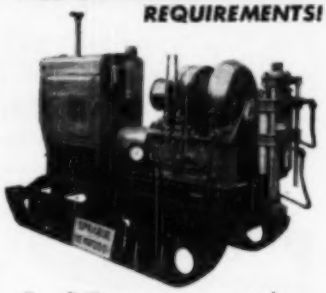

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Saint Dominique, Paris 7. Papers to be read at the conference should be mailed in duplicate to the secretary before Mar. 1.

Part of the meetings will be held in the new research laboratories of the Charbonnages de France now being completed on a 75-acre estate at Verneuil, 50 km north of Paris. Following the conference, delegates will be taken on a tour of the most recent French coal-washing plants.

More Safety Achievements

Brock No. 4 mine, Christopher Coal Co., Cassville, W. Va., has mined 5,003,074 tons without a fatal accident, the W. Va. Department of Mines recently announced.

Mine No. 15, Pittsburg & Midway Coal Mining Co., operated from December, 1939, to November, 1949, mining 3,844,780 tons without a fatality, according to a report to the National Coal Association. The company's mine No. 18 worked the calendar year of 1947 without a lost-time accident.

Coal Publications

How Salaried Employees Benefit From Job Evaluation, by R. M. Schmitz. National Foremen's Institute, New London, Conn. 32 pp. 5½x8¼-in; paper. 50c per copy; quantity prices on request. What job evaluation will and will not do for salaried employees; steps for setting up a program.

How to Be Human on the Job, by W. G. Strathern. National Foremen's Institute, New London, Conn. 56 pp. 5½x8¼-in; paper. 50c per copy; quantity prices on request. Nine basic rules for attaining good human relations. What to do and how to do it.

Synthetic Liquid Fuels Abstracts, 772-979, by J. L. Wiley and H. C. Anderson. U. S. Bureau of Mines. Vol. 2, No. 6 (New Series). 96 pp. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. Abstracts of publications on synthetic processes, materials, structures, etc.

Proper Sizing of Excavators and Hauling Equipment, Technical Bulletin No. 3. 26 pp. 8¼x10¾-in; paper. 50c, Power Crane and Shovel Assn., 74 Trinity Place, New York City 6; free to excavator owners, engineering schools and colleges. Analysis of factors affecting efficiency, with performance tables and formulas.

Rewinding Small Motors (Third Edition), by D. H. Braymer and A. C. Roe. McGraw-Hill Book Co., 330 W. 42d St., New York City 18. 422 pp. 6¼x9¼-in; cloth. $4.50. How to manage winding jobs, by hand or machine,

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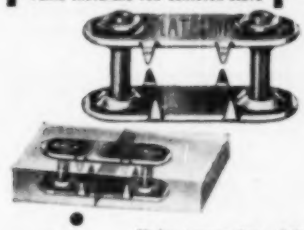

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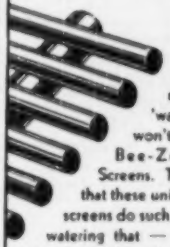

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Pump Questions and Answers, by Roy Carter, I. J. Karassik and E. F. Wright. McGraw-Hill Book Co., 330 W. 42d St., New York City 18. 346 pp. 6¼x9¼-in; cloth. $5. Simple question-and-answer treatment of construction, application, operation, installation, maintenance and troubles of centrifugal, reciprocating, regenerative, rotary and vertical-turbine pumps. Photos, drawings and graphs.

Papers Presented at the Eighth Conference on Coal Utilization, 1948. Engineering Experiment Station, University of Illinois, Bulletin 58. 151 pp. 6x9-in; paper. 75c. Coal production and preparation, fuel needs and supplies, burning equipment, home designs for coal use, air purification, customer relations and salesmanship.

Radiant Heating, by T. Napier Adlam (2nd edition). The Industrial Press, 148 Lafayette St., New York 13, N. Y. 504 pp. 6x9-in; cloth. $6 in U.S.; $6.45 in Canada and elsewhere. New edition includes developments and updated data since first edition, 1947, with special stress on floor, ceiling and wall panels; snow melting; and specifications for use with various building materials. Charts and tables.

Petrographic Analysis of Coal by the Particle Count Method, by Bryan C. Parks. State Geological Survey, Urbana, Ill. 49 pp. 6¾x9½-in; paper. No price quoted. Development of a standard procedure, plus discussion of its reliability and accuracy.

Analyses of Iowa Coals. U. S. Bureau of Mines, T. P. 706. 25c, Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. Reserves, characteristics, production and uses of Iowa coals, plus discussion of economic standing of the industry and recent trends.

Review of Literature on Conditioning Air for Advancement of Health and Safety in Mines. U. S. Bureau of Mines, I. C. 7528. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. Summary of progress in eliminating hazards and solving problems of underground ventilation as reflected in bibliography of 64 publications and reports describing mines around the world.

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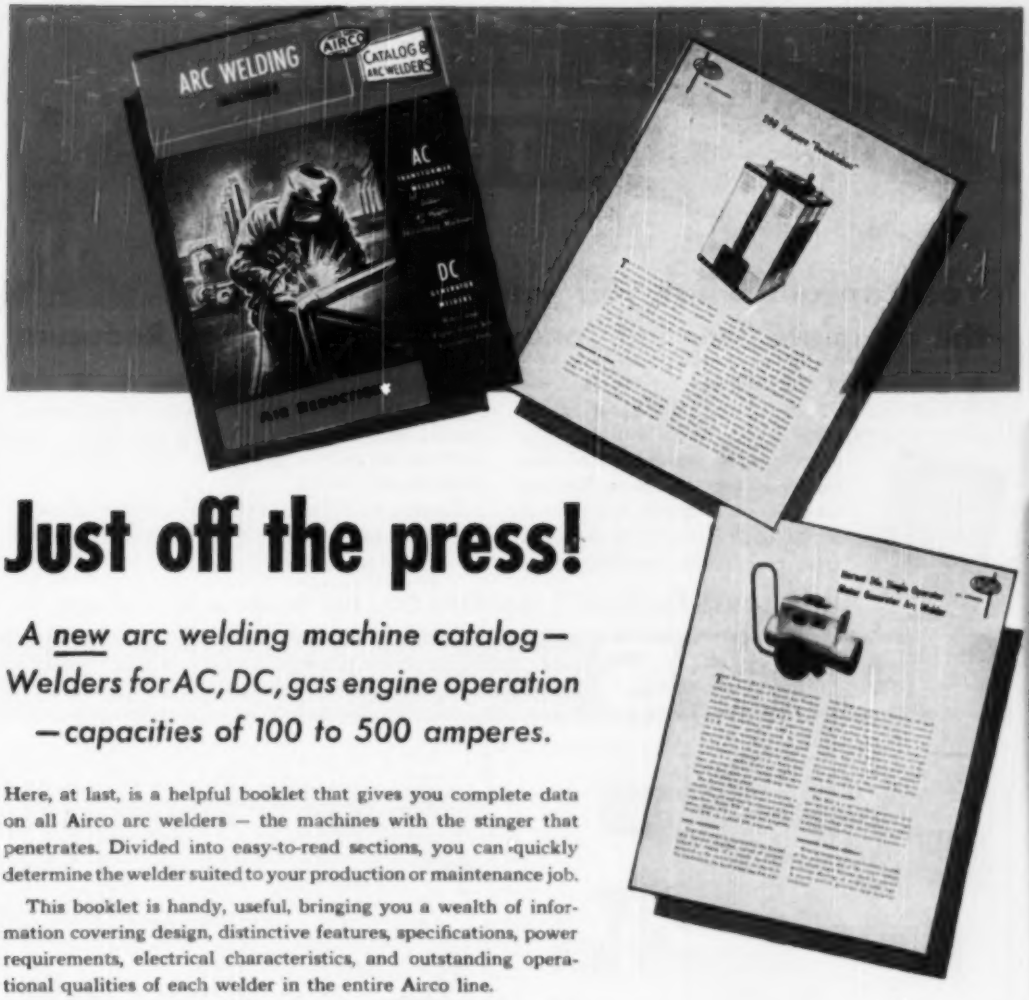

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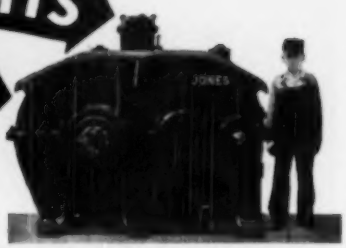

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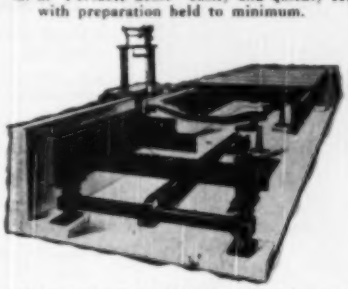

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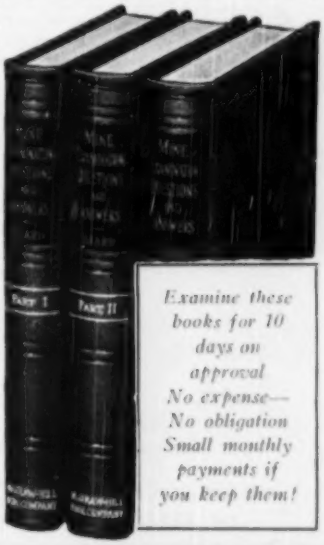

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- Economical upkeep
- Topmost efficiency

SATISFACTION GUARANTEED
Catalog and Prices sent upon request

INDIANA FOUNDRY COMPANY
950 Oak Street — Indiana, Pa.

HOFFMAN BROS. DRILLING CO.

Diamond Core Drilling Contractors
Punxsutawney, Pa. · Tel. 382

WE HAVE SPECIALIZED IN TESTING BITUMINOUS COAL LANDS FOR MORE THAN 40 YEARS

GASOLINE • STEAM • ELECTRIC DRILLS • WE PRE-GROUT SHAFT LOCATIONS • HORIZONTAL DRILL HOLES FROM 3" TO 16" FOR DEWATERING MINES • OUR OPERATORS ARE HIGHLY SKILLED

WE HAVE ALWAYS GUARANTEED SATISFACTORY COAL CORES... We solicit your inquiries

"We look into the earth"

CORE DRILLING —anywhere!

PENNSYLVANIA Drilling CO.
DRILLING CONTRACTORS AND MFRS.
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EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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NEW ADVERTISEMENTS received by 10 A.M. January 16th will appear in the February issue subject to limitations of space available.

WANTED
CHIEF ENGINEER

For progressive southern company, operating several high tonnage mines. Must be fully experienced in design and construction of surface installations and in underground layout and mechanized operation. Requirements are extremely high; opportunity is outstanding.

Address P 1757, Coal Age
520 N. Michigan Ave., Chicago 11, Ill.

SALES ENGINEER

With experience in coal preparation for nationally known product, large territory, must be willing to travel. Car essential.

SW 1457, Coal Age,
520 N. Michigan Ave., Chicago 11, Ill.

REPLIES (Box No.): Address to office nearest you.
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

ENGINEER EXPERIENCED in design of mine and industrial cars. Give complete qualifications, experience and references, stating age and salary required. Address P. O. Box 2212, Birmingham, Alabama.

BUSINESS OPPORTUNITIES

For Lease—1,000 Acres
strip coal land in Sevanee seam in Tennessee, from 3 to 9 feet thick; near highway and railroad. Chas. C. Moore, 1324 Hamilton Bank Bldg., Chattanooga, Tennessee.

For Lease—Approximately 625 Acres
coal land with large additional acreage available. Average 48" thickness. Located on State Highway with Railroad and Power. Close to available markets. Deep mine only. For full particulars write Harold E. Wynn, 806 Peoples Bank Building, Canton, Ohio.

For Sale—Buildings and Equipment
Truck Coal Mine and acreage.
Coal to the rise, self drainage.
Semi smokeless coal; no soot in coal burning equipment, boiler flues, etc. All necessary tools.

Butler County, Ky.
E. W. Hoit **Central City, Ky.**

FOR SALE
LARGE WAREHOUSE, SHOP AND OFFICE FACILITIES

Several large buildings on about an acre of land with railroad siding. Centrally located in Middlesboro, Kentucky, at an excellent location to conveniently serve the Kentucky, Virginia and Tennessee Coal Fields. Could be used for warehousing or manufacturing. Price very reasonable.

For inspection and further information write

B. Perini & Sons, Inc.
Box 138 **Phone 464**
Middlesboro, Kentucky

TRANSFORMERS

BOUGHT AND SOLD
We carry a large stock of transformers, and invite your inquiries.
PIONEER TRANSFORMER REBUILDERS
We rewind, repair and redesign all makes and sizes. One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

— FOR SALE —
42 GAUGE MINE CARS
2 To 3 Ton Capacity
Used, but in sound working condition
THE DAVID J. JOSEPH COMPANY
P. O. Box 1022 Cincinnati, Ohio
Phone—CApitol 4100

BUY NOW—IMMEDIATE DELIVERY
NEW—USED-REBUILT MACHINE TOOLS.
Lathes, Drills, Shapers, Shears, Mills, Hammers, Air Compressors, Foundry Machinery, Machine Shop & Industrial Equipment.
Send us your inquiries for prompt service.
FALK MACHINERY COMPANY
10 Ward St., Rochester, N. Y. Phone Baker 5087

FOR SALE
One Roberts Schaefer Marcus Shaker — Drive head #4.
Black Diamond Coal Mining Co.
(Incorporated)
Drakesboro, Ky.

FOR SALE
Bucyrus-Erie 200-B electric shovel, mounted on caterpillars; 10 cu. yd. bucket; shovel in excellent condition; has been used loading coal in strip mine. Reason for sale, we have installed 17 cu. yd. Bucyrus-Erie 550-B. Specifications and photographs sent on request.
NORTHWESTERN IMPROVEMENT COMPANY
Gaylrip, Montana

BALL BEARINGS:

We have in stock over 500,000 ball bearings of various grades, produced by leading manufacturers, suitable for mining equipment and machinery, for immediate delivery at attractive prices. Please do not call. Send us a letter or a card listing your current requirements.

Polish American Supply Corp.
39 Broadway **New York 6, New York**

HERMAN NELSON PORTABLE HEATERS

250,000 BTU's

Complete with air-cooled gas engine, one 12-inch x 24-ft. duct, and, six 6" x 14-ft. ducts.

SALE PRICE ONLY $295.00

100,000 BTU PORTABLE
HEATER and DRYER
Stewart Warner portable, powerful 100,000 BTU gasoline-burning Heaters, with Turbine type blowers; 1½ hp air-cooled, ball-bearing engine; 2 ducts 145-ft. total. IMMEDIATE DELIVERY

SALE PRICE $195.00

Excellent Operating Condition Guaranteed
Especially Adapted for MINE USE

HEATING Mills, Bunkhouses, Dry Rooms, Large Boarding Houses, Shops, Sheds, Warehouses, Bldgs. under Construction, Spot Heating, etc.

THAWING Frozen Ore, or preventing freezing in Ore Bins, Frozen Areas, Machinery, Pipe Lines, Tanks, etc.

DRYING Concentrates in Ore in conjunction with Tumbler; Wet ore in bins; Plaster, Paint, Mortar, etc.

PRE-HEATING engines, tractors, trucks, equipment, etc.

● VAST QUANTITY OF REPLACEMENT PARTS
● Also SERVICE MANUAL & PARTS CATALOG
PHONE COLLECT—your Heater can be shipped within 2 hours, or, SEND FOR LITERATURE.

BERNSTEIN BROS.
MACHINERY CORPORATION
Phone 6006 • "Since 1897" • PUEBLO, COLO.

BARGAINS FOR SALE

LATE TYPE CUTTING MACHINES
250 VOLT DC

5—Goodman 212-AA Low Vein.
6—Sullivan 10-B Low Vein.
8—Jeffrey 28-U Permissible Type Trunk Cutters.
5—Joy 7-AU Permissible Type, Universal.
15—Goodman 512-CJ Permissible Type, Universal.
10—Jeffrey 35-BB Permissible Type.
7—Goodman 112-AA Universal.
9—Jeffrey 34-L Late Type Longwall.

LATE TYPE CUTTING MACHINES
220/440 VOLT AC

10—Goodman 12-CJ on tip-turn trucks.
7—Goodman 112-CJA.
8—Sullivan 7-B on tip-turn trucks T-B.
5—Goodman 512-CLS on tip-turn trucks.

LOCOMOTIVES, 250 VOLT DC
BALL BEARING MOTORS

1—New 20-ton Jeffrey Tandem.
5—15-ton Goodman, Type 50, A-04C.
3—15-ton General Electric, Type HM820.
3—15-ton Jeffrey, Type MH110.
3—11-ton Westinghouse, Type 900C.
5—10-ton Goodman, Type 50-B.
5—10-ton Westinghouse, Type 907C.
5—6-ton General Electric, Type HM810.
4—8-ton Westinghouse, Type 905C.
4—8-ton Goodman, Type 52A14T.
6—6-ton Westinghouse, Type 904C, with new YR-8-A Cable Reels.

The above Locomotives have been completely rebuilt. We have four General Electric HM821, 250 volt DC, 42" gauge, Gathering Locomotives with CY-21 reels and cable, completely rebuilt and guaranteed, which we are offering at $4,250.00 each, subject to immediate inspection and prior sale.

BELT CONVEYORS

1—Jay LaDel 36" Belt Conveyor, 5,000' centers.
1—Jay LaDel 20" Belt Conveyor, 3,000' centers.

Both Belts are practically new, complete with drives, head and tail sections, idlers and all necessary appurtenances.

Many other items of equipment to offer. Mail us your inquiries. Will pay cash for any good equipment you have to sell. Send us your list.

LOADING MACHINES, 250 VOLT DC

8—Joy 14-BU.
6—Joy 8-BU.
11—Joy 7-BU.
8—Joy 11-BU.
5—Joy 12-BU.
8—Jeffrey L-400.
3—Jeffrey L-500.
5—Jeffrey L-600.
3—Goodman 490
2—Goodman 360.

BATTERY LOCOMOTIVES

10—7-ton General Electric, Type 803-B, with good Exide batteries.

SUBSTATION EQUIPMENT

150 KW, 200 KW, and 300 KW Late Type Motor Generator Sets and Rotary Converters, equipped with switchboards and all necessary switchgear.

Frank J. Wolfe—Sheldon J. Wolfe

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

COAL MINE EQUIPMENT SALES COMPANY

Since 1912

FRANK J. WOLFE
LONG DISTANCE PHONE 24

SHELDON J. WOLFE
TERRE HAUTE, INDIANA

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 15" to 56" Track Gauge.
GREENSBURG MACHINE CO.
Greensburg, Pa.

For Sale

2—12BU-7E Joy Loading Machines, 250 Volt D.C.

Buckley Smokeless Coal Corp.
Phone 8173
P. O. Box 830 Buckley, W. Va.

OTTUMWA HOIST: cylindro-conical, 1" rope groove, hoisting range to 400', 150 HP AC 2300 volt motor, complete with all magnetic controls ready for operation, excellent condition.

SHEAVES: 2—60" wrought iron, deep groove for 1" rope with shaft and bearings, practically new, $75.00 each fob.

RR TRACK SCALE: 100 ton, 50 ft., weighs perfectly, $500.00 where-is, now set up for operation.

LONGWALL CONVEYORS: 2—each 300 ft., complete and in excellent condition.

LONGWALL MACHINES: AC—Goodman and Sullivan CLE and CH8, will sacrifice.

ELMIRA COAL COMPANY
Excelsior Springs, Mo.

NEW and REBUILT
MOTORS
GENERATORS
TRANSFORMERS
1 to 1500 H. P.

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, NEW YORK

FOR SALE

MOTORS • TRANSFORMERS
MECHANICAL AND ELECTRICAL MACHINERY
HOISTS • PUMPS • MINE LOCOMOTIVES
CONTROLS • REPAIRS

(1) 600 HP, G.E., Type I, Form M, 2300 volt, 60 cycle, 3 phase, 450 rpm., continuous rated, wound rotor, 2 bearing motor.
(1) G.E. full reversing magnetic inlet control equipment complete with resistors and all accessories.
(1) 907C, 250 volt, 36" gauge, ball bearing locomotive.
(1) 805C, 250 volt, 48" gauge, ball bearing locomotive.
(3) Westinghouse, 18" gauge, ball bearing Battery.
A very fine stock of centrifugal Pumps, Hoists, Transformers, etc.
Send no 1-cm inquiries on items required and items for disposal.

E. P. DIETRICK
829 Richmond St., Scranton 9, Pa., Phone 3-7357

FOR SALE
Diesel Generator Plant

1—150 KW Westinghouse DC Generator, 250 v., driven with two (2) Buda Diesel motors (5¾x6"), complete and guaranteed.

Gasoline Generator Plant

1—35 KW DC Generator Plant, driven with new Buda gasoline engine, complete and guaranteed.

If interested, contact:

Atlas Supply & Equipment Company,
305 North Fourth Street,
Clarksburg, West, Va.

VIBRATING SCREENS
CONVEYORS—FEEDERS
SCALES—CRUSHERS
CONVEYOR IDLERS

Guaranteed Equipment
Immediate Shipment

MINE TIPPLE AND TRUCK SCALES

15 Ton Truck Scales	$450.00
20 Ton Truck Scales	510.00
26 Ton Truck Scales	565.00

Other scales to 50 ton capacity. All truck scales complete with structural steel weighbridge. Replacement parts for most all makes of scales.

5 Ton Tipple Scales	$312.00
15 Ton Tipple Scales	480.00
20 Ton Tipple Scales	465.00

COAL CRUSHERS

10 to 20 tons per hour capacity	$395.00
60 to 200 tons per hour capacity	785.00
90 to 375 tons per hour capacity	1785.00
120 to 500 tons per hour capacity	2285.00

PAN AND RECIPROCATING FEEDERS

15 to 35 tons per hour capacity	$150.00
28 to 60 tons per hour capacity	190.00
50 to 100 tons per hour capacity	575.00
100 to 175 tons per hour capacity	800.00

VIBRATING SCREENS

Approximately 100 machines in stock, ranging in screen sizes from 2'x5' to 5'x16' and with 1 to 5 decks. Eccentric weight or positive throw eccentric shaft types.
Prices from $395.00

CONVEYORS—PICKING TABLES

Troughing Idler conveyors—picking tables. Lengths from 10' to 500', widths to 60".
Prices from $395.00

TROUGHING AND PICKING TABLE IDLERS

All steel, interchangeable with other well-known makes of idlers. Precision ball bearings with alemite fittings. Replaceable bearings. Shafts run clear through, and no bearing adjustments are required. Easy to start and will run in cold weather. Rust-proof ball races; maintenance is negligible. Build your own conveyors: We have all parts, including standard sections, head and tail pulleys, take-ups, drives, idlers, speed reducers, sheaves, belting, etc.

3-roll Troughing Idlers:

14" belt width	$18.50	24" belt	$21.00
16" belt	19.00	30" belt	22.00
18" belt	20.00	36" belt	23.00
		42" belt	24.00

1-roll Return Idlers:

24" belt width	$8.25	36" belt	$9.75
30" belt	9.00	42" belt	10.50
		48" belt	11.25

More than 2000 mines have Bonded equipment.

BONDED SCALE & MACHINE CO.

2190 S. Third St. Columbus 7, Ohio
Phone Garfield 2186
University 2832, Eves.

Manufacturers of Scales, Conveyors, Conveyor Supplies, Idlers, Vibrating Screens, Crushers and Feeders.

COAL MINE EQUIPMENT—NEW REDUCED PRICES

COAL CRUSHERS
1—36" American Ring Type.

FLOTATION MACHINES
3—No. 24, 8-cell, Denver "Sub-A" Flotation Machines, wood tanks, rubber impellers, 43"x43" cells, motorized.

MAGNETIC PULLEYS
1—24" Belt Feeder, 5'6" centers, with 26" face x 24" dia. Dings Magnetic Pulley, R. C. Drive to 2 HP Gear Motor, complete with motor generator set.
2—26" face x 24" dia. Dings 250 volt DC Magnetic Pulleys.

JIGS
2—New 18"x36", 4-compartment, Hartz Jigs, Oregon Fir Construction.

BELT CONVEYORS
1—14", 20' centers, new belt, V-belted to 1½ HP Motor.
1—24", 15' centers, Motorized.
1—30", 30' centers, new belt, on steel frame R.C. Drive to a 2 HP Gear Motor.
1—42", 20' centers, Motorized.

GENERATORS — DIESEL
3—D-13000 Caterpillar Diesel Generators, 75 KW, 440 volts, AC.
1—D-4400 Caterpillar V-belted to 30 KVA, AC Generator.

FILTER
1—4', Six Disc Eimco Filter, complete with vacuum equipment—motorized.

PIT CARS
150—Card Iron Works R.B. Pit Cars, 36" gauge.
1—Card Iron Works Rock Car, 90 cu. ft. capacity.

FREIGHT ELEVATORS
1—Nock & Garside Continuous, Push-button Type, Capacity 3000 lbs. Traveling Speed 285 RPM, direct connected to 25 HP Motor, complete with counter weights, wire rope, etc.

SCREENS
1—4'x8' Hum-mer, Tandem, Single Surface.
1—30"x6' Trommel.
1—30"x15' Trommel.
1—48"x16' Revolving.
1—48"x8' Trommel.

BINS & WATER TANKS
2—20'x20' Wood Stave Bins.
1—Wood Stave Water Tank 20' dia. x 12' high.

LARRY CARS
4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

TROLLEY LOCOMOTIVES
2—7½ Ton Goodmans, 36" gauge, 250 volts DC.

WAGON DRILLS
1—Ingersoll-Rand, with drifter, all on pneumatic tires, used about 6 months.
1—Sullivan ☒1W-6, with drifter, on steel wheels, AC Motor.

MISCELLANEOUS
Guaranteed DC Motors—50% of New Price.
1—90 cu. ft. C.S. Card Rocker Dump Car.
1—CE-7 Sullivan AC Coal Cutter.
Drag Chain Conveyors of various widths and lengths.
1—Ingersoll-Rand 3-drum Slusher Hoist with built-in 50 HP AC Motor.
6" Spi-weld and 6" Wood Pipe.
Ingersoll-Rand Cent. Motor Mtd. Pumps.
Triplex Pumps—Piston Pumps.
Deep Well Pumps—Wilfley Sand Pumps.
Hydroseal Pumps—Turbine Pumps.
Sheet Steel—Structural Steel.

WRITE FOR BULLETIN NO. 10

FLORENCE MACHINERY AND SUPPLY COMPANY

Suite 904, Equitable Bldg. **C. J. Parrish, Mgr.** **Denver 2, Colorado**

MOTOR GENERATOR SETS

1000 KW, General Electric, type MCF-8, 250 volt DC, 900 rpm, driven by 1,400 HP, General Electric Synchronous motor.

300 KW, General Electric, type MPC, 125/250 volt DC, driven by 450 HP, General Electric Synchronous motor, 1,200 rpm.

3—300 KW, General Electric, type DMC, 250 volt DC, generator driven by 458 HP, General Electric, type PT motor, 720 rpm.

250 KW, General Electric, type MPC, 125 volt DC, compound wound, driven by 370 HP, 720 rpm motor.

150 KW, Westinghouse, 250 volt DC, generator, driven by 225 HP, Synchronous motor, new unit.

100 KW, Delco, 250 volt DC, Squirrel Cage motor.

100 KW, Westinghouse, type SK, 125 volt DC, Squirrel Cage motor.

COMPLETE STOCK, FROM 1 KW.

L. J. LAND, INC.

P. O. BOX 756 **READING 4, PA.**

PHONE: 2-6866

AVAILABLE 'NOW' USED D.C. MOTORS

7½ h.p. G.E. 300 v. 450/1250 r.p.m.
7½ h.p. G.E. 1 v.—600/1200 r.p.m.
7½ h.p. G.E. 230 v.—1150 r.p.m.
5 h.p. C-W Vertical, 230 v.—600 r.p.m.
5 h.p. G.E. v.—450/1800 r.p.m.
5 h.p. West 220 v.—835 r.p.m.
1 h.p. G.E. 230 v.—525/2100 r.p.m.
1 h.p. G.E. 230 v.—1150 r.p.m.

PARTIAL LISTING ONLY—INQUIRIES SOLICITED. ALSO A.C. MOTORS—ALL SIZES.

FALK MACHINERY COMPANY

18 Ward St., Rochester, N. Y.

Baker 5887

M-G SETS — ROTARIES
3 ph. 60 cy.

500 KW West. 550 v.—710 HP 2300 v. Syn.
650 KW G. E. 275 v.—2300 v. Syn., 720 RPM.
300 KW G.E. Rotary 275 v. with 3-110 KVA 2300/4000 v. Transformers and control.
200 KW G.E. 275 v.—300 ϕ Syn. 2300/3/60.
250 KW West. SK 250 v. 2300 v. Syn., 1200 Rev.
150 KW G.E. 275 v.—325 ϕ Syn., 2300/3/60/1200 Rev.
150 KW West. 125-225 HP Ind. 2300/440/220 v.
100 KW Ridy 275 v.—150 HP Syn. 2300 v.
100 KW West. 125 v.—150 HP Ind. 2300/440/220 v.
50 KW G.E. 250 v.—70 HP Syn. 220/440 v.

MOTORS AND GENERATORS

500 ϕ G.E. MT412, 2300/3/60, 450 Rev. S.S.
350 ϕ HP. West. CW 2300/3/60 600 RPM S.S.
300 HP. G.E. IM 2300/3/60 450 RPM S.S.
150 HP. G.E. KT 220/440 v. 695 RPM.
100 HP. G.E. Type I K 2200/3/60 600 RPM S.C.
150 HP. G.E. Syn. 220/440/3/60 600 RPM.
150 HP. West. CR 220/440/3/60 500 RPM S.C.
100 HP. G.E. IM 440-220/3/50 450 RPM S.S.
100 HP. Allis AN 440-220/3/60 865 RPM S.C.
75 HP. West. SK. 153, 230 v. 1150 RPM.
60 KW West. SK 250 v. 1250 RPM Gen.
60 HP. West. CR 220/440/3/60 1200 RPM S.C.
50 HP. West. SK. 93, 230 v., 1750 RPM.
150 KW Triumph 250 v. 600 RPM Gen.
150 KW G.E. 550 v. RC 1150 RPM Gen.
125 KW West. SK 250 v., 600 RPM Gen.
100 KW West. SK 250 v., 600 RPM Gen.

TRANSFORMERS

1—100 KVA All. Ch. 220 v.—220 v.
6—75 KVA G.E. 2300 v.—115/230 v.

LOCOMOTIVES
Haulage and Gathering

30/25 Ton G.E. 500 V. 42"/44" ga. 2HM834 B.B. Motors.

12 ton Jeff. 250 v. 44" Ga. MH11D.
10 ton Jeff. 250 v. 36/42" Ga. MH 110 Motors.
8 ton Goodman 500 v. 42/44" Ga. 91044C.
6 ton Goodman 250 v. 42/44" Ga. 91044C.
6 ton Jeff. 250 v. MH 99 Gath. 42" Ga.
6 ton West. 250 v. 904 Motors 36" Ga.
3 5 ton Goodman 36 B 250 v. 42" Ga. Gath.
2 4 ton Goodman, 250 v., 42" Ga. sgl. motor, gath.

LOADING MACHINES & SHUTTLE CARS

3—14 BU. Joy 250 V. D.C. permissible.
1—8 SU. Joy 220/3/60 A.C. permissible.
3—5-Ton Joy Shuttle cars with batteries.

STORAGE BATTERY LOCOMOTIVES

6 ton GE. Permissible BB Motors, 36/44" Ga.
5½ ton Ironton Type A 36/42 Ga.

MINING MACHINES

1—35B Jeff. 250 V. permissible.
1—1128J Goodman 250 V. permissible.
1—512 Goodman 50 ϕ A.C. 220/3/60 perm.
1—1203 Goodman 220/3/60 open.

HOISTS, CRANES AND PUMPS

300 HP Lidgerwood sgl. flxd drum, 6½" dia. 3' face. 5" flanges grooved—1½" cable, 300 HP 2300/4000/3/60 Westgh. C.W.

75 HP Mead Morrison sgl. fr. drum—AC Motor.
1 50-75 HP 2 drum Meade Morrison slope.
50 HP Heyl & Patterson sgl. fixed drum, 4' dia.

PROMPT SHIPMENT ON ALL SIZES A. C. AND D. C. REBUILT MOTORS.

MOORHEAD ELECTRICAL MACHINERY CO.

Noblestown Road, OAKDALE, PA.
Pittsburgh District

Pittsburgh } Walnut 1-4300
Tel. Exchange } Walnut 1-4301

R. T. McNEES

COAL MINE EQUIPMENT
NORTON, VIRGINIA

Hotel	Phones
Norton	608 & 300

ROTARY CONVERTER

1—300 KW G-E Rotary Converter, 2/60/440 (transformers for 2300 or 4160), 250/275 volt DC, 900 RPM; w/control.

C & S MACHINERY COMPANY

715 Howard St. **St. Louis 6, Mo.**

WAR SURPLUS — U. S. SIGNAL CORPS EQUIPMENT

BIG ANNUAL MONEY-SAVING SALE

Genuine EE8 Portable Telephones & Telephone Wire

Once Again! BRAND NEW FIELD TELEPHONES Available!

Ea. brand new phone, formerly priced at $31.50 **NOW only $17.50 ea.**

PRICES SLASHED ON TELEPHONE WIRE FOR THIS SPECIAL SALE

Prices specially reduced to near wholesale cost.
STOCK UP NOW AND SAVE. ORDER TODAY!

W110B Weather-proof, durable, 2-conductor twisted telephone wire, insulated, stranded 7x.013, reinforced with steel strands for extra tensile strength (3 copper and 4 steel). **Many extra uses.**

Grade I unused, NEW, stored in open.

One-Mile Reels, formerly 27.50 mile
SALE SPECIAL . . . $21.00

½-Mile Reels, formerly 14.25 ea.
SALE SPECIAL $11.00

500 Ft. Coils, formerly 3.95
SALE SPECIAL $3.00

1,000 Ft. Coils, formerly 7.25
SALE SPECIAL $5.75

Grade II, unused, outer layer wire weathered but when removed inside layers perfect. Usability not impaired.

ONE MILE REELS, formerly 27.50 mile. **SALE SPECIAL $17.50**

½-MILE REELS, formerly 14.25 mile. **SALE SPECIAL $9.00**

W130 Lightweight Assault wire, 2-conductor.

TWO-MILE REELS, unused, **NEW.** (10,560 ft. continuous) wt. only 85 lbs. A real material. Formerly 57.50 reel. **SALE SPECIAL $37.50**

BRAND NEW ½-MILE REELS. Wt. 16 lbs. Formerly 15.00. **SALE SPECIAL $12.95**

½-MILE REELS, slightly weathered, unused..... $4.95

Field Communication promotes safety — saves man hours. **Compact. Rugged. Portable.** Performance equals present-day commercial telephones. **Hundreds of uses for quick, low-cost, dependable two-way communication on-the-job!**

Amazingly simple to install and operate. Just connect terminals of two or more phones to any two-strand wire and you are ready to talk! Up to six phones can be used on single line without using a switchboard. Powered by standard flashlight batteries. No maintenance required. Each phone complete with self-contained hand-operated ringer. **Originally cost government $39.95 each. Every phone checked for perfect operation and fully guaranteed!**

TELEPHONES LIKE NEW. Each phone thoroughly reconditioned like new.

Each phone **$12.95** | SPECIAL: 2 for **$24.50**

USED, Recondit. Exc. Ea. $9.95
SPECIAL: 2 for $18.50

Reduced prices on all parts for Field Telephones.

WRITE FOR FREE FOLDER — MANY OTHER SPECIALS!

All prices FOB Sacramento. No COD. Purchase orders accepted from firms with D & B rating. Small orders sent postage collect plus small handling charge.

SEND CHECK OR MONEY ORDER **LORIS SALES**

P. O. Box 1896-Y, Sacramento, Calif.

Substation Headquarters
ROTARY CONVERTERS
150 to 500 kw stocked
ROTARY TRANSFORMERS
Stock
(and wound to specifications)
ROTARY SWITCHBOARDS
Carried in stock

Make up your own AC & DC manual switchboards from parts in our stock, reasonably priced; knife switches, circuit breakers, panels, meters, etc.

Your inquiries solicited.

R. H. Benney Equipment Co.
1004 Montgomery Road — Norwood, Ohio

FOR SALE

One Goodman Universal 35 H.P. Permissible 250 volts Standard Goodman trunk in A-1 condition.
One 20 B. Goodman Locomotive with reel and cable, 42" gauge, in good mechanical condition, 250 volts.
Two M. H. 90 Jeffrey 4-ton with cable reel, 250 volts, 42" gauge, A-1 condition.
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The Inland Steel Company, Wheelwright, Kentucky, will offer for sale March 1, 1950, a 700-tons per hour steel tipple, complete with shaker screens, loading boom, crushers and motors. The tipple is equipped to load lump, egg, stoker and nut slack.

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1—30x36 United Iron Works single roll crusher.
1—24x48 McNally Pittsburgh double roll crusher.
1—30x60 Link Belt double roll crusher.
1—30x36 Jeffrey Single Roll Crusher.

HOISTS

1—Ottumwa Iron Works conical drum hoist, serial #3163, weight 25,000#, 1½" rope, complete with remote control and hydraulic brake. Direct connected to GE 800 HP motor, model #CS9447, type ITC-5017, form M 3/60/2200V, 870 RPM, 72½ amps. 870 secondary amps. complete with automatic switchboard.

1—Ottumwa Iron Works, single rigid cylindro-conical drum hoist, serial #4008, weight 43,500 lbs. 1¼" rope, complete with remote control and hydraulic brake direct connected to Western Electric 150 HP. motor, model 17815, type MT-544-10-150-720, form B, 3 phase, 60 cycle, 440 volts, slip ring, secondary volts 388, amps. 187, secondary amps. 181, speed full load 700, serial #4543813, continuous 40° C. Complete with controller and resistance.

1—Ottumwa Hoist #3941, drum diameter 60", face 96", face grooved for 1" rope, equipped with post brake 84" diameter, hand operated, single reduction cut spur gears, 19 teeth and 106 teeth, 1¼" pitch, 16" face, drum shaft 7" diameter, drum shaft bearing 7"x14", pinion shaft bearing 6⅛"x18" of the ring oiling type.

LOCOMOTIVES

1—13 ton Goodman ball bearing locomotive, 42" gauge, type 26B-0-4-T.

4—8 ton Goodman ball bearing locomotives, 36" gauge, type 82AO4T.

1—8 ton Goodman ball bearing locomotive, 42" gauge, type 82-AO-42.

1—8 ton Westinghouse locomotive, 36" gauge, Class 4-2-35-C-437.

1—4 ton Jeffrey locomotive, 42" gauge.

6—4 ton GE ball bearing locomotives, 42" gauge, class EM27NSM111 with HM821-A motors.

1—4 ton Whitcomb Battery locomotive, 36" gauge.

2—4 ton Goodman ball bearing locomotives, 36" gauge, type 43-1-4-T. (with or without gathering roels.)

MINING MACHINES

6—42JB AC, 3 phase, 60 cycle, 220 volt, Sullivan longwall mining machines.

1—Jeffrey Shortwall Mining Machine, 35 HR, AC, 6' cutter bar complete with tip turn trunk, cable and reel.

1—Sullivan Shearing Machine, Class CH11, DC, 9' cutter bar.

2—Sullivan Longwall Mining Machines, type CH9, 3/60/220 volts, 30" cutter bars.

1—Sullivan shearing machine, class CH 11 AC.

1—12AA Goodman mining machine, 50 HP, 42" gauge.

2—Goodman Standard mining machines, 60 HP, 3/60/220 volts, 42" gauge.

MOTOR GENERATOR SETS

1—60 KW GE motor generator set type CD 152, form A, comp. wound, 337 amps, 250 volts no load, 270 volts full load, 1200 RPM, cont. 50 deg. cent., #1339905 direct connected to 125 HP GE sya. motor type TS, form PK, frame 7358, 3/60/2300 volts, 1200 RPM, 37.6 amps, cont. 40 deg. cent. Excitation 250 volts, 5.0 amps. .74 PF, #4314071, complete with switchboard.

1—200 KW Ridgeway syn. motor generator sets, 2300 volts AC, 1200 RPM, 250-275 volts DC, complete with switchboard, one has brand new GE automatic circuit breaker.

20 KW General Electric motor generator set, 250064, type BR, form C, I.R. 250070-20, 200 amps, 250 volts, 1740 RPM, cont. 50° C, direct connected to 75 HP General Electric induction motor, type KT337-4-75-1090 Form B, 3 phase, 60 cycle, 220 volts, 174 amps, 1,790 rpm, #4333991, cont. 40° C, complete with manual switchboard and compensator.

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Carload lots new 12 lb., 16 lb., 20 lb., 25 lb. and 30 lb. rails. Price and delivery information upon request.

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1—200 KW Westinghouse Rotary Converter complete with transformers and switchboards.

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2—Denley AC Electric coal drills, class 472, 3 phase, 60 cycle, 220 volts.

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Several hundred feet used 500,000 CM Weatherproof stranded copper.

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Several thousand feet 1,000,000 CM lead covered copper.

1,500 feet 2/0 3/Conductor rubber covered cable—used.

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12—G20 Goodman Duckbills Complete, AC.
2—G20 Goodman duckbills, DC.

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200 All Steel Timken Roller Bearing Mine Cars. Overall height 3' 10". Overall length 7' 6". Overall width 6' 5". Wheelbase 2' 5". 42" gauge, 14" Timken Roller Bearing Wheels.

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6—4 Ton G.E. Ball Bearing 42 inch Gauge
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1—200 K.W. M.G. Set 1200 R.P.M. Complete with Switchboard
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4—8 BU Joys 36 and 42 Inch Gauge on Cats. A.C. and D.C.
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1—500 KW G.E. Syn., 275 V. 900 RPM
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1—400 KW WEST. Syn. 575 V. 720 RPM
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1—200 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM

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1—500 KW G.E. 275 V. MPC, Form L 900 RPM
1—500 KW G.E. 575 V. MCF, Form H 900 RPM

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1—500 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW G.E. Syn. 275 V. HCC 1200 RPM
1—300 KW G.E. Syn. 575 V. HCC 1200 RPM

CONVERTER ARMATURE

1—300 KW G.E. 575 V. HCC, Form P 1200 RPM

LOCOMOTIVES

2—30 T JEFFREY 250 V. MH-77 48-36" Ga.
1—20 T JEFFREY 250 V. MH-77 48-36" Ga.
3—13 T JEFFREY 250 V. MH-2110 42-32" Ga.
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1—29B—1 yard Bucyrus Erie power shovel with new Diesel engine.

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1—64'x20"x8 ply.
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1—44'8"x18"x8 ply.
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1—10'6"x14"x6 ply.
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1—Medart Belt idler for 20" belt (used 1 yr.).
1—64'x12"x6 ply.
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1—126', 24", 8 ply, ⅛" top, 1/16" bottom Super Service Boston Woven Hose Company belt 42 oz. duck.

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1—☓6 Gates Reduction Crusher, Style "K," 14x52, 700 RPM, 38 to 72 TPH Settings 2" to 3½".

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1—General Electric Alternating Current Generator, Type ATB-28-125-257, 2300 V, 31.5A, 245 RPM, 135 HP.

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2—125 HP horizontal, Vogt Boilers, operating condition.

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6 ph. 60 cycle

Qu.	KW	Make	Speed	DCV
1	500	G. E.	1200	600
1	300	G. E.	1200	600
1	300	G. E.	1200	275
2	175	G. E.	1200	275
1	75	G. E. (3 Ph.)	1800	275

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MINING MACHINE

One (1) 25H Jeffrey Mining Machine, Serial #12974, 220/440 v. A.C.

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Four (4) La-Del Model FA Flight room Conveyors, complete 200-ft. long with 7" deep pans.

One (1) FA Conveyor same as above, 165-ft.

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One (1) Model MTB-26" Belt Conveyor 1,100-ft. long.

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Six (6) used 572 440 v. A.C. Chicago Pneumatic Coal Drills.

Two (2) NEW 572 440 v. A.C. Chicago Pneumatic Coal Drills.

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1,040-ft. 6 Con. Comb. Anhydrex SA & Neoprene Jacketed underground cable, 600 v., 3-Conductor #6 3 Ground wire #10 (NEW AND ON REEL).

1,010-ft. 6 Cond. Comb. Shielded Anhydrex SA & Neoprene Jacketed underground cable, 7,500 volt Neutral Grounded 3-Cond. #4 7 Strands and 3 Ground wires #8, 7 Strands (NEW AND ON REEL).

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HP		MAKE	TYPE	SPEED
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200		Westg.	SK-210	600
175		G. E.	MD	450
150		Westg.	SK	500
125		G. E.	CD	400
125		Century	drip proof	1800
100		Westg.	SK-190	700
100		Westg.	S	635
75		G. E.	CDM	1800
60	NEW	G. E.	DC—splash proof	850
40	NEW	Westg.	SK-133	850

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KW		MAKE	TYPE	SPEED
250		Westg.		1200
200		Westg.	SK 210	600
150		Westg.	SK	600
110		Westg.	SK-190	700
100		Westg.	SK	720
100		Westg.	S	850
100		G. E.		900
75		Allis Chalmers		720
75		Westg.	S	850
75		Allis Chalmers		850
60	NEW	G. E.	CD	1150
40	NEW	Westg.	SK-133	1150

MG Sets 250/275 V. D.C.

KW	MAKE	RPM	VOLTS	TYPE
200	Westg.	1200	2300/4100	Ac Ind.
200	Westg.	1200	220/440	AC Syn.
150	Burke	900	2300	AC Syn.
100	Westg.	900	2300	AC Syn.
100	Delco	1200	220/440	AC Syn.

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1—S.A. Heavy Duty Loader AC

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42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
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	14"	6	8"	6	4"	5
	12"	6	8"	5	4"	4
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2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
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	50 "	10.00	1.50 Pair
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	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
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1"	25 "	6.25		50 "	15.00
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THE INDUSTRIAL EQUIPMENT CORP.
910 First National Bank Bldg., Atlantic 1-6387
Pittsburgh 22, Pa.

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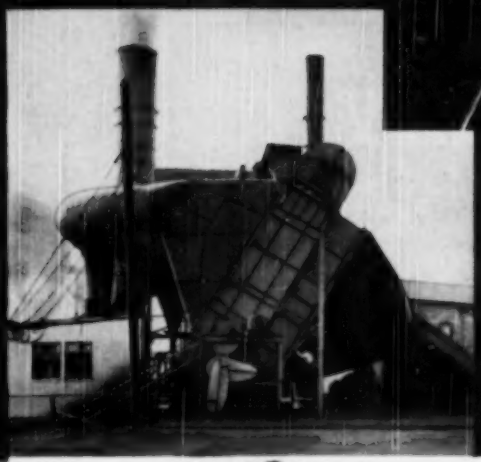

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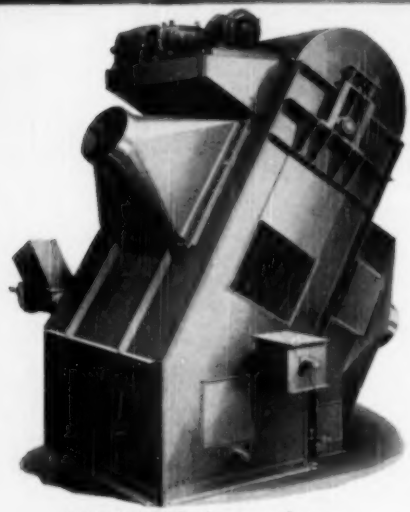

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